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ABSTRACT

Preliminary groundwater investigations have been conducted for a formerly used waste disposal site, Rogers Quarry, on the U. S. Department of Energy Y-12 Plant.

Data on hydrostatic heads and water quality for the shallow flow regime in soils and the upper weathered bedrock zone and deep flow regimes within the bedrock below the zone of significant weathering have been obtained. During CY 1986 wells at this site were monitored for inorganic and organic indicator parameters. There is, with minor exceptions, no evidence of contamination entering the groundwater system from this site. This document provides an initial summary and interpretation of hydrostatic head, water chemistry, and water quality data obtained during CY 1986.

1. INTRODUCTION

1.1 Background

This document provides an initial summary and interpretation of hydrostatic head and water chemistry data obtained from groundwater investigation wells surrounding the currently-used waste disposal site, Rogers Quarry, at the U. S. Department of Energy Y-12 Plant in Oak Ridge, Tennessee (Fig. 1). Water level observations for the calender year (CY) 1986 are presented using hydrographs, water table elevation maps, and hydrological cross sections. Major and minor element chemical data for groundwaters from the sites are presented using Piper diagrams and triangular plots.

Generalized, preliminary hydrological and hydrochemical interpretation of results for the site is presented. Detailed interpretations will be presented after the completion of CY 1987 hydrostatic head measurements and chemical sampling.

1.2 Data Sources and Methods

Hydrological and chemical data used in this report were obtained from the Y-12 Assessment and Remediation Program . The data were collected as part of that programs CY 1986 environmental monitoring activities. All data used in the preparation of this report are on file in the Assessment and Remediation Program central data base.

Water level measurements were obtained on a weekly basis by ORNL or Y-12 personnel. Measurements were obtained with either sonic or electric tape devices. Quarry water level measurements were obtained at either weekly or daily intervals by manually reading a staff gage at the quarry outfall. The hydrographs presented in this report were prepared with data from the central data base. Water table contour maps for the site were prepared for selected dates on a topographic base map of the site. The map is based on the data contained in the hydrographs. Both true north and grid north are shown on the map; however, observations made in this report are in reference to true north. Hydrological cross sections were prepared from site topographic maps, using the data contained in the hydrographs. Hydrological cross sections are, when practical, oriented parallel to the gradient of the water table at the site. The orientation of the cross section is shown on the well location map provided for the site.

Chemical data used in this report were obtained during quarterly sampling of the wells in CY 1986 by personnel from the Oak Ridge Gaseous Diffusion Plant (ORGDP). The chemical data are contained in the central data base of the Assessment and Remediation Program. All analytical data were produced by the analytical chemistry facility at ORGDP and were originally reported on a mg/L or g/mL basis. To construct the Piper diagrams, data for the major cations and anions were recalculated to a milliequivalents/L basis. Alkalinity values and specific analyses for carbonate and bicarbonate were not obtained for CY 1986 samples discussed in this report. To obtain estimated values for bicarbonate ions, a charge balance calculation was performed and the deficient charge was assumed to be equivalent to that produced by bicarbonate ions. The Piper diagrams

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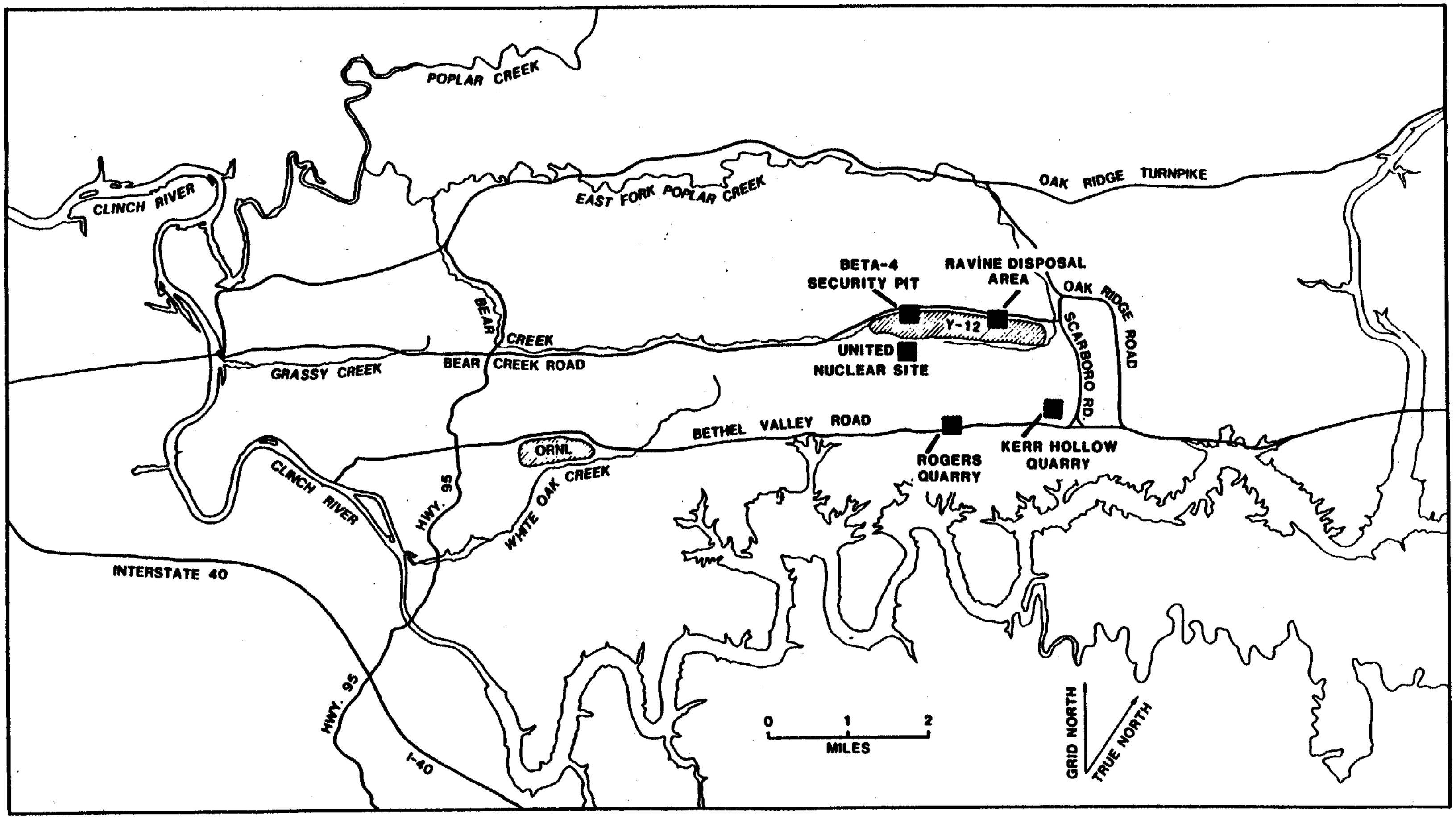

FIGURE 1: Index map showing site covered by this report.

illustrated in this report are calculated on a milliequivalents/L basis for the ionic species indicated on the diagrams. The trilinear diagrams plotting silicon, (calcium+magnesium), and (sodium+potassium) were prepared by recalculating data for these components to millimoles/L.

2. ROGERS QUARRY

2.1 Background

Rogers Quarry is located along Bethel Valley road, approximately 3 mi west of Kerr Hollow Quarry and 5 mi east of Oak Ridge National Laboratory (Fig. 1). The quarry is approximately 3000 ft south of the Y-12 complex and is located on a line of low hills running along the north side of Bethel Valley at the southern edge of Chestnut Ridge. The quarry was a source of construction materials in the 1940's through the late 1950's. It was abandoned in the early 1960's and has subsequently been used for disposal of a variety of materials from the Y-12 Plant. It currently receives fly-ash slurry from the Y-12 Steam Plant. Background details and a summary of disposal operations is presented elsewhere (Production Optimization Department/Y-12 Plant, 1984).

The quarry is situated in the lower portion of the Chickamauga Group. Stockdale (1951) divided the Chickamauga into 8 units, A through H, based on rock type and bedding patterns; Unit A is the lowermost unit. The footwall (bottom) of the quarry is the uppermost portion of Unit B of the Chickamauga Group. Unit B consists of interbedded red to reddish-gray calcareous siltstones. The unit is variable in character and thickness throughout the Oak Ridge vicinity; at the quarry it is approximately 220 ft thick but only the uppermost 50 to 100 ft are exposed in the quarry proper. Within the quarry this upper portion is predominantly siltstone. The hanging wall (top) of the quarry is Unit D and the lowermost portion of Unit E of the Chickamauga Group. Units D and E consist of interbedded gray calcareous siltstones, wavy to evenly bedded limestones, and thinly bedded charts. All of Unit D (20 ft) and approximately 100 to 150 ft of Unit E are exposed at the quarry. The pay zone of the quarry consists of Unit C of the Chickamauga Group. This unit is a medium to light gray, pure, evenly bedded limestone. The limestone is medium- to fine-grained and, in several intervals, approaches lithographic limestone in quality and uniformity. Unit C is approximately 150 ft thick and is 100 percent exposed at the quarry.

Depths to bedrock at the quarry, away from the workings, vary from 10 to 30 ft. The contact between overburden and bedrock appears to be sharp, occurring within several feet. All strata at Rogers Quarry have an uniform dip to the southeast of 35 to 45. Large scale (several tens of feet or more) folds or faults appear to be rare. On a small scale (less than several tens of feet), however, the strata exhibit joints and fractures with the density and lateral continuity of such features varying from bed to bed. Most fractures appear to be filled with secondary calcite mineralization although open fractures occur throughout the strata at the quarry. Thin (<1 to 20 ft) chert-rich intervals typically have the highest fracture density, followed by thin limestone-rich intervals. Siltstones typically exhibit the lowest fracture density. There are, however, numerous exceptions to the preceding generalization and the analysis of fracture-joint patterns at the quarry will be a complex task. The limestone-rich portions of all units locally exhibit solutionally-widened bedding surfaces and fractures or, locally, fracture zones. Such zones range between <1 ft to 5 ft in thickness. No discrete solution cavities were noted.

The porosity and density geophysical logs suggest that most of the strata are "tight" with low porosity and, by inference, low permeability (Haase and King, 1987). A significant exception to this pattern occurs in the limestones of Units

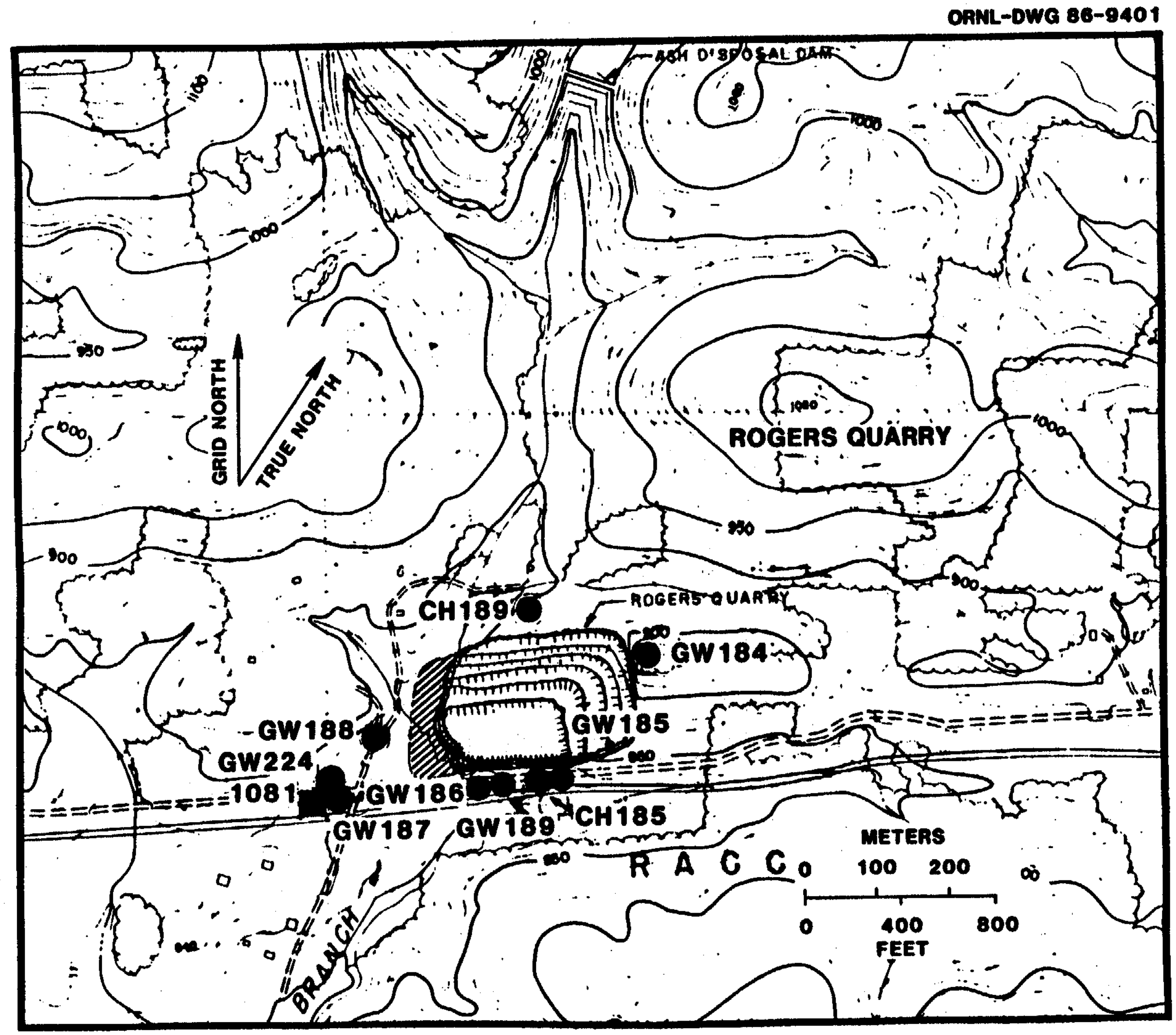

FIGURE 2: Well location map for the Rogers Quarry site.

D and E and more rarely in those of Unit C. Several anomalies are noted on the electric logs for limestones of these units that suggest there are thin (<1 to 3 ft), relatively permeable, water-bearing zones occurring within these units. Correlation of the electric log anomalies with drill core and with acoustic logs demonstrates that the electric log anomalies are usually associated with fractured zones. Drilling at the southwest corner of the quarry penetrated two of the fracture zones identified from electric log anomalies at depths of 120 and 160 ft (Haase et al. 1987a). Water production was approximately 25 gpm from the upper fracture zone and 25 to 50 gpm from the lower fracture zone. Water from both zones had a distinct "sulfur" smell. Electric logs for the borehole to the south of the quarry suggest that, at depths of below 250 and 350 ft, a low resistivity fluid occurs in the well bore. Until a sample can be obtained for chemical analysis, all that can be inferred about this fluid is that it has very low resistivity, much less than is typical of "fresh" water occurring in the shallow subsurface. The electric log patterns resemble those observed in deep, brine-flooded boreholes in Melton Valley near the ORNL Hydraulic Fracturing Facility (Haase, 1987). These observations suggest a complex shallow subsurface hydrological system that may be underlain by a deeper, brine-dominated system. At this juncture, however, nothing definitive can be said.

2.2 Hydrological Data

2.2.1 Well Network

Seven groundwater investigation wells (GW-184, GW-185, GW-186, GW-187, GW-188, GW-189, GW-224) were installed surrounding the Rogers Quarry site in 1985 (Fig. 2). Construction details for the wells are presented elsewhere (Haase et al. 1987a). Well 1081 was installed south of the quarry during a previous drilling program (Haase et al. 1987b). Two additional coreholes, CH-185 and CH-189 were drilled at the site to determine subsurface geology and to identify drilling targets for groundwater investigation wells.

Well GW-184 is completed in interbedded maroon siltstones and gray limestones of the lowermost portion of Unit C of the Chickamauga Group that form the footwall of the quarry. Well GW-188 is finished in a fracture zone within the limestones of Unit D of the Chickamauga Group. Wells GW-187 and GW-224, along with an existing well, 1081, form a piezometer cluster south of the quarry. Well 1081 is screened in unconsolidated residuum and soil developed on Unit E of the Chickamauga Group, and wells GW-224 and GW-187 are completed in fracture zones within Unit E of the Chickamauga Group. Wells GW-185, GW-186, and GW-189 form a piezometer cluster southeast of the quarry. Wells GW-186 and GW-189 are completed in fracture zones within Unit C of the Chickamauga Group. Well GW-185 is completed in Unit B of the Chickamauga Group.

2.2.2 Water Levels and Hydrographs

Hydrographs for the four shallowest wells are illustrated in Fig. 3. Hydrographs for the southeastern piezometer cluster (wells GW-186 and GW-189) and the southern piezometer cluster (wells 1081, GW-187, and GW-224) are illustrated in Figs. 4 and 5. Elevation data for the water level within the quarry are illustrated in Fig. 6. Hydrostatic head data collection for wells at the Rogers

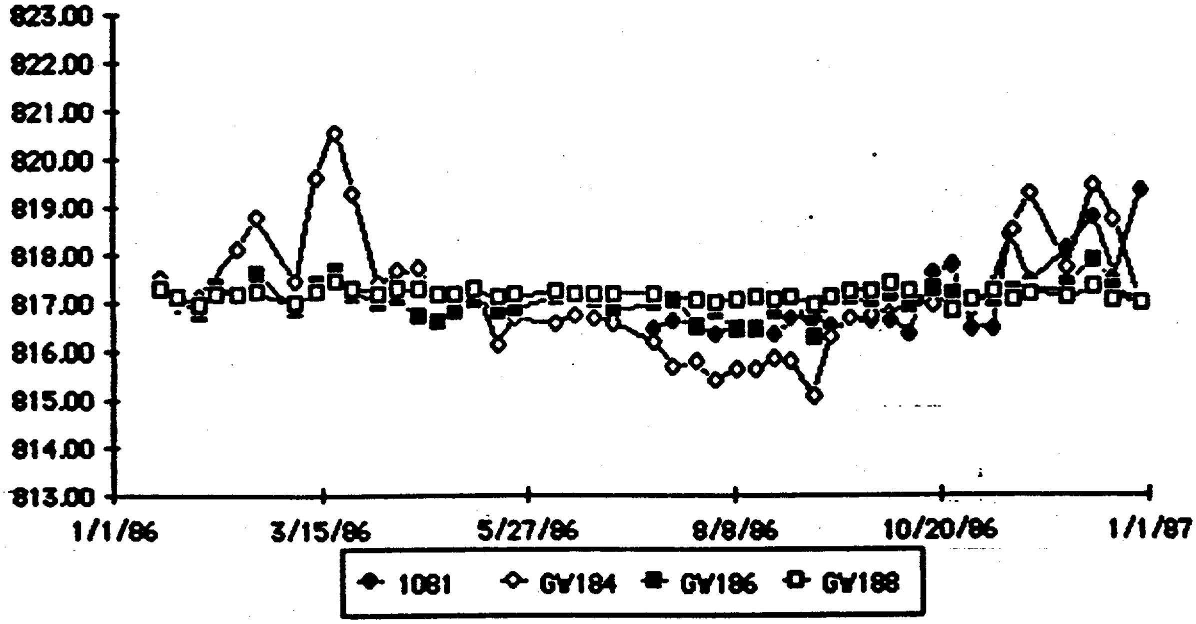

FIGURE 3: Hydrographs for water-table wells at the Rogers Quarry site.

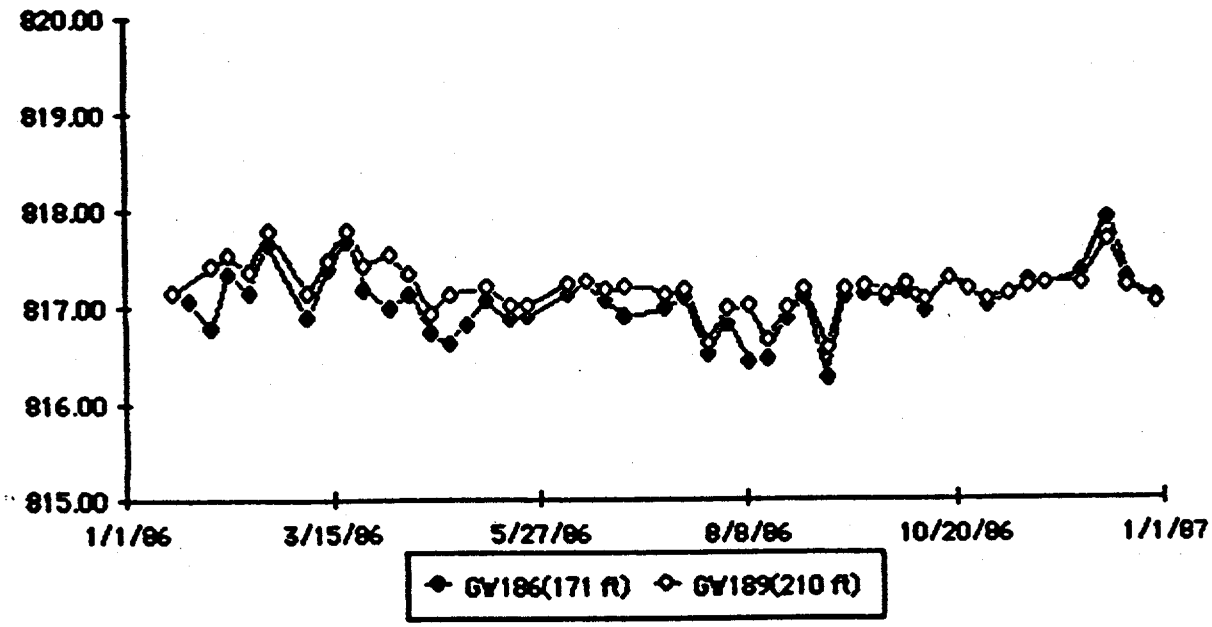

FIGURE 4: Hydrographs for the southern piezometer cluster at the Rogers Quarry site. Total depths of wells, measured in feet below ground surface, are given within parentheses.

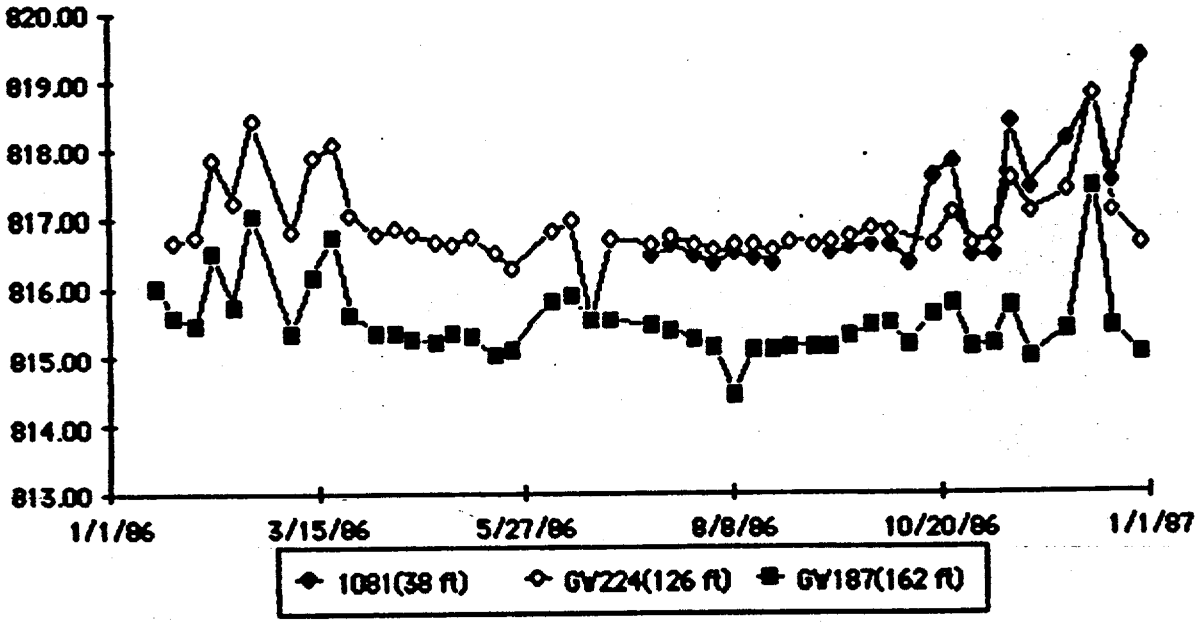

FIGURE 5: Hydrographs for the southwestern piezometer cluster at the Rogers Quarry site. Total depths of wells, measured in feet below ground surface, are given within parentheses.

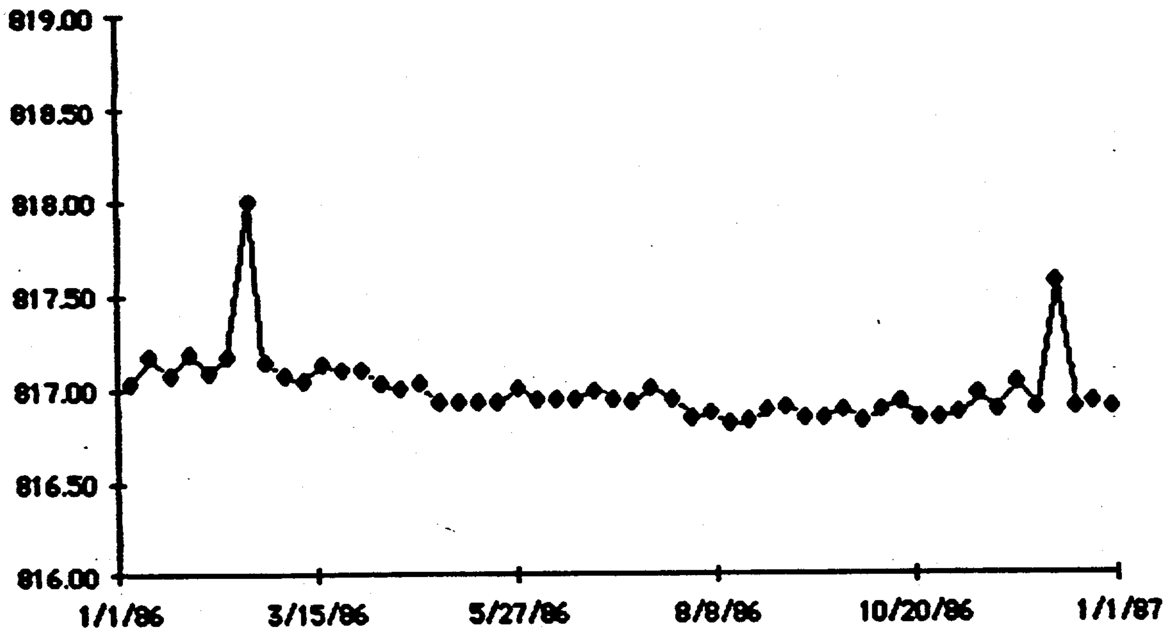

FIGURE 6: Water level elevations within Rogers Quarry.

Quarry site began on a weekly basis in January 1986. Quarry water elevation measurements were obtained on a weekly to daily basis throughout 1986.

The hydrographs for the shallow wells illustrated in Fig. 3 indicate complex hydrological behavior at the site. Throughout the year, well GW-188 exhibits only minor head fluctuations and approximates the level of water within the quarry (Figs. 3 and 6). Wells 1081 and GW-186 exhibit a greater range of head fluctuations than well GW-188. During the low precipitation period of June to August 1986, the heads in wells 1081 and GW-186 were below those in well GW-188, and during periods of increased precipitation, such as in November and December 1986, the heads in these wells were significantly greater than those in well GW-188. Well GW-184 exhibits the largest head fluctuations at the site and has significant departures from the fluctuation pattern characteristic of quarry water elevations and hydrostatic levels within well GW-188. During periods of precipitation, highest hydrostatic head in well GW-184 was more than 2 ft greater than those in other wells surrounding the quarry. Because of the complex hydrostatic head fluctuations, various wells become the up-gradient well for the site throughout the year. During periods of increased precipitation, well GW-184 has the greatest hydrostatic head and becomes the up-gradient well for the site. Throughout much of the year, however, especially at times of low precipitation, well GW-188, or the quarry itself, have the greatest hydrostatic head and become the up-gradient well for the site. Because of the complex hydrological response of the site, and the relationship between water levels in the quarry and some of the wells surrounding the site there is no easily definable gradient to the groundwater system.

Hydrographs for wells GW-186 and GW-189 (Fig. 4) suggest that the hydrological systems investigated by the two wells are closely linked. Trend patterns for the two wells are similar, although response differences are noted during periods of precipitation, such as between March and May 1986. The deepest well in the cluster, GW-185, is finished in low permeability siltstones of Unit B of the Chickamauga Group. Since its construction in late 1985, the well has been essentially dry. Therefore, no hydrostatic head data are available.

Hydrographs for wells 1081, GW-187, and GW-224 (Fig. 5) suggest significant differences between shallow bedrock hydrological systems and those deeper in the subsurface. Trend patterns and responses of wells 1081 and GW-224 suggest that the hydrological systems investigated by the two wells are closely linked and that these systems are also influenced by the quarry water level. The hydrograph for well GW-187 exhibits generally similar response characteristics to those for the other wells. The hydrostatic head in well GW-187 is typically 1 to 2 ft less than those observed in wells 1081 and GW-224, suggesting that there is a downward hydraulic gradient at the site of the cluster.

2.2.3 Water Table Maps and Hydrological Cross Section

Two water table elevation maps are presented (Figs. 7 and 8). Hydrological conditions for a time when well GW-184 is the up-gradient well for the site (December 12, 1986) are illustrated in Fig. 7. Hydrological conditions for August 8, 1986, when well GW-184 is not the up-gradient well are presented in Fig. 8. Water table elevation contours are not illustrated.

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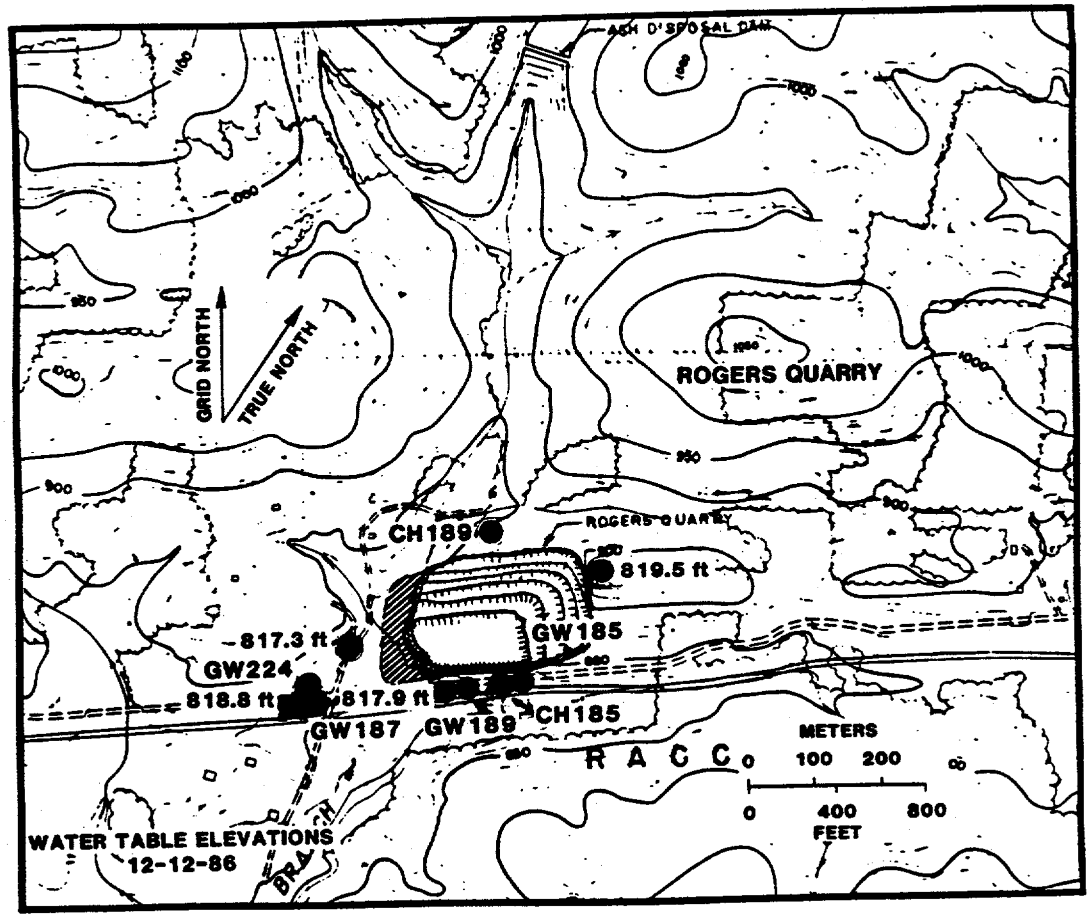

FIGURE 7: Water table elevation map for the Rogers Quarry site during a period of high precipitation.

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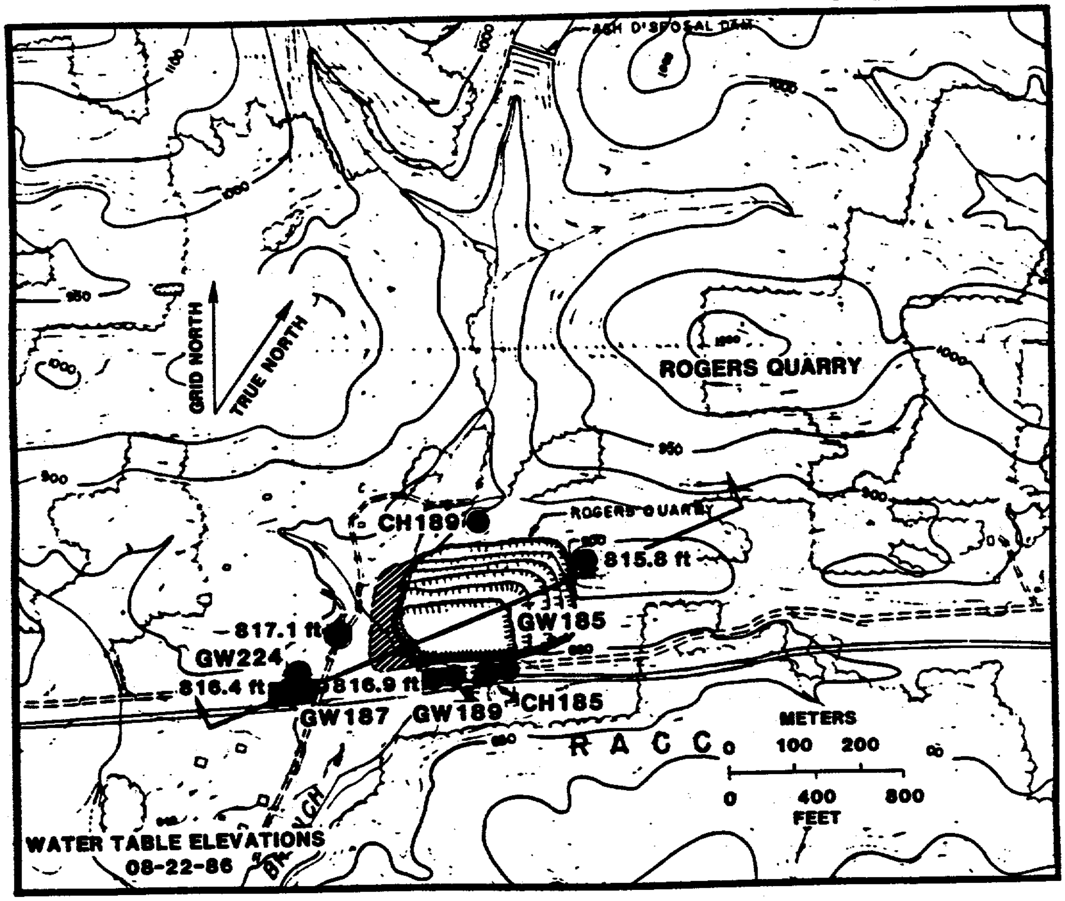

FIGURE 8: Water table elevation map for the Rogers Quarry site during a period of low precipitation. Line with arrowheads indicates orientation of hydrological cross section illustrated in Fig. 9.

A hydrological cross section for August 22, 1986 is illustrated in Fig. 9. If the groundwater system surrounding the quarry can be treated as one interconnected flow system, the equipotential lines illustrated on the hydrological cross section suggest that the quarry may serve as a source of water to the surrounding groundwater system during low precipitation periods.

2.3 Water Chemistry

Chemical variations in groundwater among monitoring sites at Rogers Quarry are illustrated in Figs. 10 and 11. With respect to major element compositions, the groundwaters of the site are generally similar to those of group II at Kerr Hollow Quarry. The analyses plot within an elongate cluster in the interior of the Piper diagram. Calcium, alkalis (sodium+potassium), and magnesium are the major cations of Rogers Quarry groundwaters. In contrast to group II groundwaters from the Kerr Hollow Quarry locality that have Ca/Mg ratios generally 0.5, Ca/Mg ratios for groundwaters at the Rogers Quarry site are generally 0.5 (Fig. 10). As with the group II groundwaters from the Kerr Hollow Quarry locality, carbonate-bicarbonate are the major anions in the groundwaters from Rogers Quarry, with sulfate being a significant, but minor, additional anion (Fig. 10). The groundwaters from the site contain small and consistent concentrations of silicon (Fig. 11).

Groundwater from wells GW-186 and GW-189, the shallow and intermediate-depth wells in the southeastern piezometer cluster, exhibit generally similar Ca/Mg ratios (Figs. 10 and 11). However, groundwater from the intermediate-depth well, GW-189, is enriched in alkalis with respect to groundwater in the shallow well, GW-186. The deep well at the southeast cluster, well GW-185, has been essentially dry since construction in late 1985; no water samples have been obtained.

Within the intermediate and deep wells of the southern piezometer cluster, the reverse of the situation noted for the southeastern piezometer cluster is noted. At the southern cluster locality, groundwater from the intermediate well (GW-224) is enriched in alkalis with respect to groundwater from the deep well (GW-186) (Figs. 10 and 11). Data were not available for the shallow well (1081) at the south cluster.

2.4 Water Quality

During Cy 1986 the ten wells at this site (Fig. 2) were sampled each of four quarters. The sampling and analysis program being followed is consistent with the state regulation TN 1200-1-11.-.05 "Interim Status Groundwater Monitoring Requirements." The program is outlined as:

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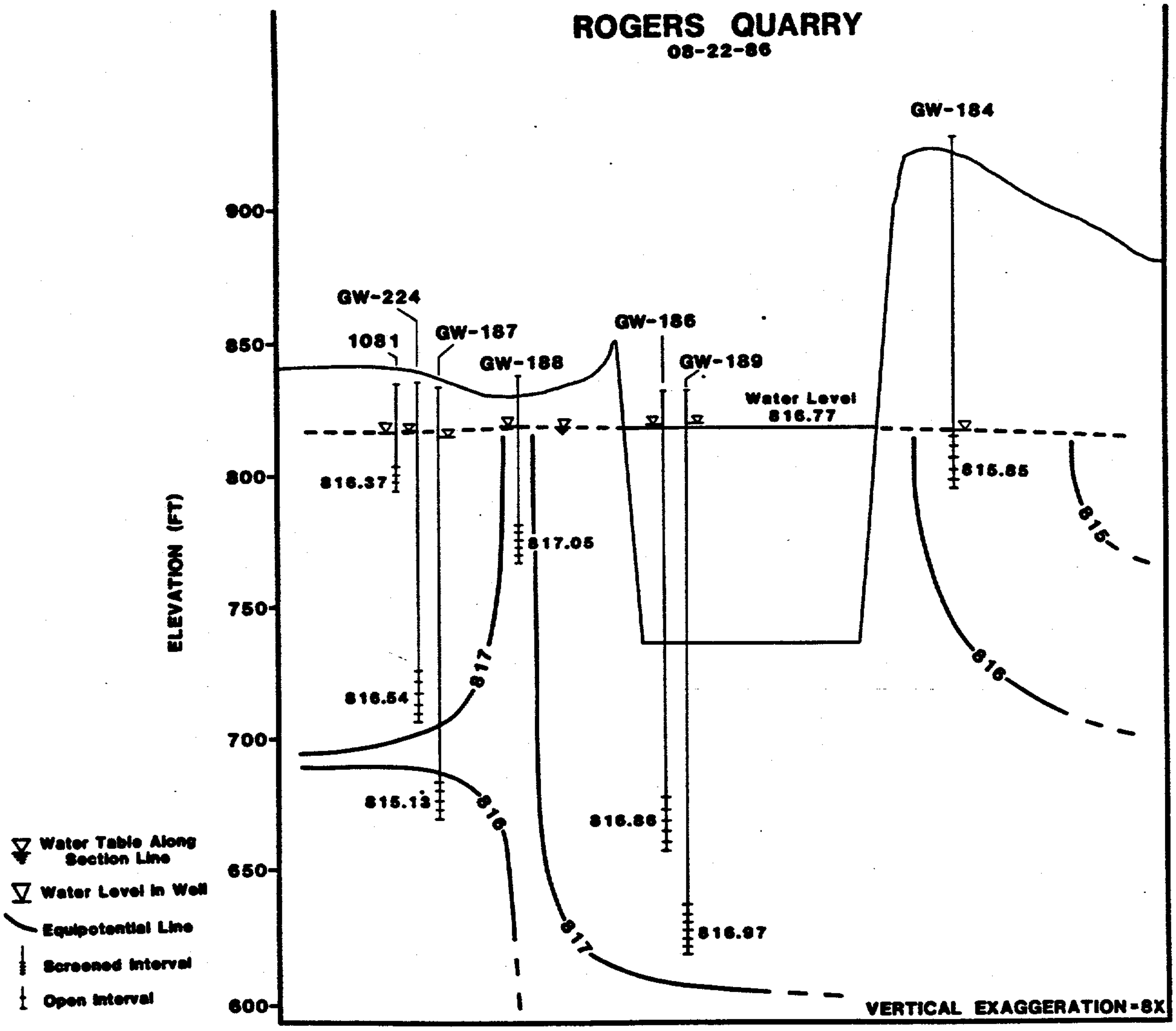

FIGURE 9: Hydrological cross section of the Rogers Quarry site.

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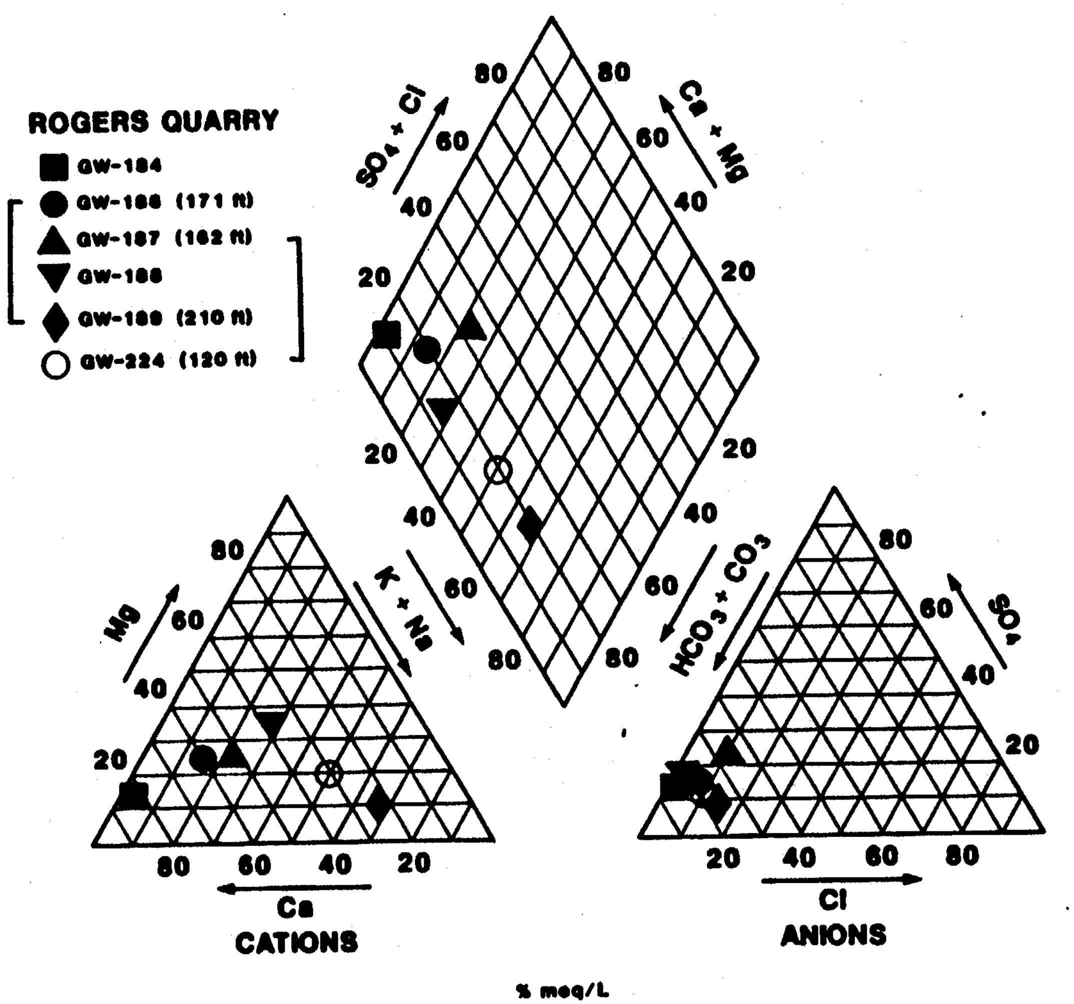

FIGURE 10: Piper diagram plot of groundwater compositions from the Rogers Quarry site. Chemical data are plotted on the basis of milliequivalents/L.

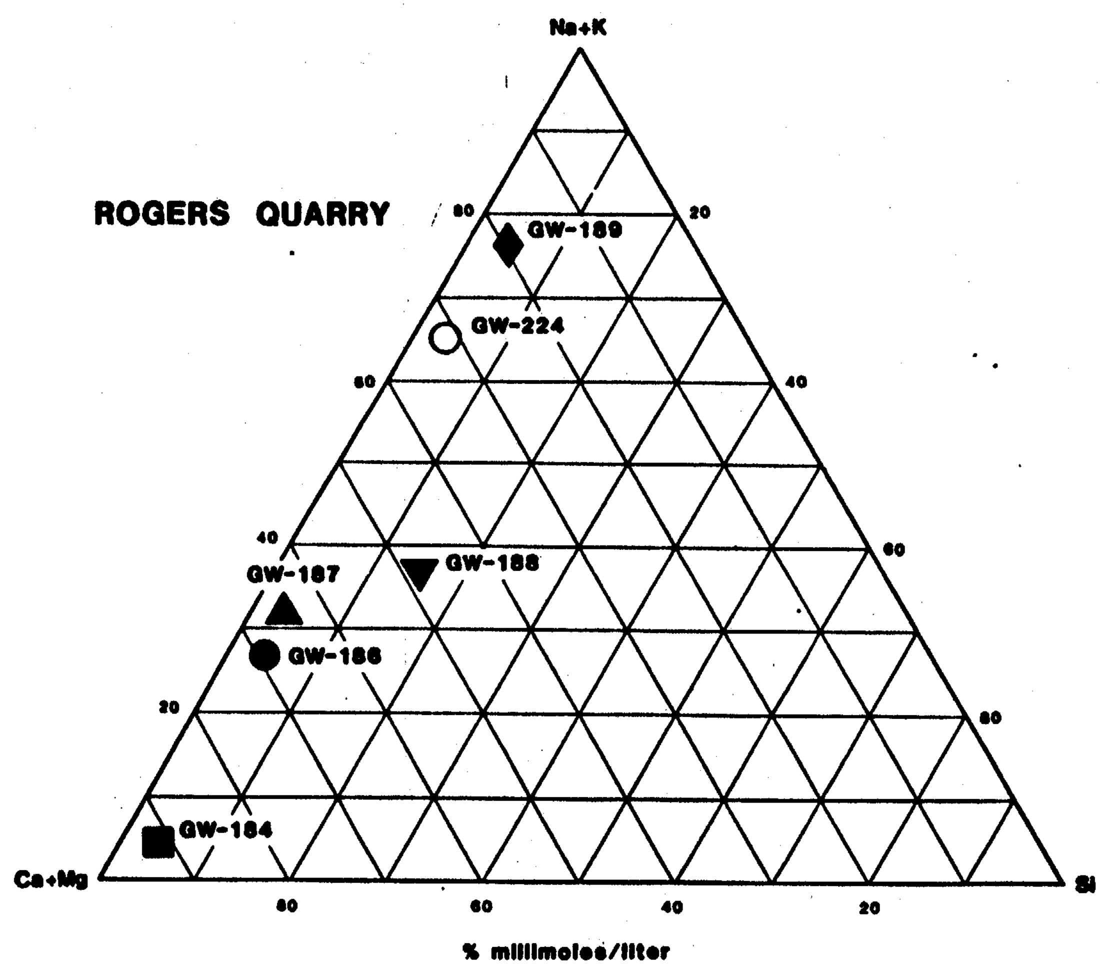

FIGURE 11: Triangular diagram plot of Ca+Mg, K+Na, and Si groundwater compositions from the Rogers Quarry site. Chemical data are plotted on the basis of millimoles/L.

YEAR 1

Primary Drinking Water Standards

Arsenic
Barium
Cadmium
Chromium
Fluoride
Lead
Mercury
Nitrate
Selenium
Silver
Endrin
Lindane
Methoxychlor
Toxaphene
2,4-D
2,4,5-TP
Radium
Gross alpha
Gross beta

Indicator Parameters

pH
Specific conductance
Total organic carbon
Total organic halogen

Parameters Establishing Groundwater Quality

Chloride
Iron
Manganese
Phenols
Sodium
Sulfate

In addition the Y-12 Plant has added these analyses to the requirements:

Total metals scan
Dissolved metals scan
Total uranium

YEAR 2 AND SUBSEQUENT YEARS

Semi-annually for indicator parameters
Annually for groundwater quality parameters and total uranium

The data are tabulated by well in Appendix 1 and the Primary Drinking Water (with the exception of the herbicides and pesticides), indicator, and groundwater quality parameters are compared graphically for all wells in Appendix 2.

The data from four sampling events are insufficient to allow a complete statistical interpretation and assessment for groundwater contamination.

With a few exceptions, the groundwater monitoring data for wells in the vicinity of Rogers Quarry have not revealed contaminant levels warranting additional concern or exceeding regulatory standards. pH (Fig. 29, Appendix 2) values for all wells have generally been within the range (</=8.3) expected for water in contact with calcareous bedrock. The first sample from GW-189 and the second sample from GW-188 exhibited anomalously high values (pH 9.0 and pH 8.5, respectively) suggesting either inaccurate pH measurements or possible invasion of well grouting agent into the screened interval of these wells. However, subsequent pH values for these wells were within expected range. Conductivity values for groundwater in the vicinity of Rogers Quarry ranged from 330 to 1010 umhos/cm (Appendix 2, Fig. 33). GW-184 initially exhibited the lowest

conductivity but has shown a gradual increase to 510 umhos/cm during 1986. GW-189 exhibited the highest conductivity. Water in Rogers Quarry generally exhibits conductivity between 300 and 500 umhos/cm. Shallow groundwater in contact with calcareous bedrock also exhibits conductivities less than 500 umhos/cm and thus GW-189, GW-186 and GW-224 may be somewhat anomalous with respect to conductivity. Two of these wells (186 and 189) are finished in relatively deep fracture zones and may be sampling waters intermediate between the surface "freshwater" system and the deeper brine-dominated system.

Bacteriological quality, as indicated by coliform plate counts (Appendix 2, Fig. 25) was within the regulatory standard of 1 ct/100 ml in all wells except GW-184 and GW-224. GW-184 also showed a trend towards increasing bacteriological contamination during 1986, whereas GW-224 indicated the presence of coliform bacteria only during the last sampling (10/20/86). Nitrate-N (Appendix 2, Fig. 21) was low (<0.2 mg/L) or undetectable in all wells except GW-184 which exhibited a very high level on 10/16/86. The presence of nitrate in this well corresponds with the elevated and increasing coliform counts and thus suggests that septic waste has invaded this well. A source for this apparent contamination is presently unknown but is being investigated.

Analyses for organic contamination in wells at Rogers Quarry has thus far been limited to herbicides, pesticides, total phenols, total organic chlorides and total organic carbon. No herbicides or pesticides have been detected and phenols have been undetectable or near detection limits. Total organic chlorides and total organic carbon are only crude indicators of organic contamination. Total organic chlorides (Appendix 2, Fig. 35) for wells at Rogers Quarry range between the detection limit (10 ug/L) and about 100 ug/L, with no consistent spatial or temporal pattern. These TOX values are believed to be "noise" in the analyses and not indicative of organic contamination. The total organic carbon (Appendix 2, Fig. 34) data for the wells are anomalous, with values ranging to over 100 mg/L. Natural uncontaminated groundwater is not expected to contain more than 1 to 5 mg/L of TOC and thus all the wells are either highly contaminated with organic compounds or the data are inaccurate. The latter explanation is currently favored because one round of field splits of samples between the K-25 Analytical Laboratory, who performed all analyses on groundwater for Rogers Quarry, and the Roy F. Weston Laboratory, indicated that the K-25 results were possibly too high by a factor of 100 and that TOC samples run by K-25 have not been purged to remove inorganic carbon. Examination of drill core from unit C of the Chickamauga Group, the geological formation in which the quarry is sited, indicates that several fracture zones contain petroleum residuals and dead oil (Haase et al. 1987a). The influence of such petroleum shows on the TOC contents of groundwater from this portion of the Chickamauga Group is not known, but could potentially be significant and be responsible for some of the elevated TOC values observed.

Among the eight (Appendix 2, Fig. 12-19) metals (As, Ba, Cd, Cr, Hg, Pb, Ag and Se) regulated under the primary drinking water standards only As, Cr and Pb approach or exceed the standards. For these metals, the values which exceed standards are all associated with GW-188, the same well which has consistently yielded highly turbid (114 to >200 NTUs) water. Such turbidity means that contaminants which occur at natural levels in the suspended matter in these turbid samples can be extracted by the acid treatment of groundwater samples to be analyzed for metals and lead to anomalously high concentrations. For example, metal concentrations measured in groundwater samples from GW-188 which had been filtered, as well as, all the other wells (Appendix 1, Tables 1-6) were all lower than the standards and in most cases near or at the detection limit.

Radioactivity, as indicated by measurements of gross activities of alpha and beta emitters and of radium (Appendix 2, Fig. 22-24) was generally within regulatory limits in groundwater at Rogers Quarry. The exceptions again involved GW-188, with its highly turbid water. For example, gross alpha activity exceeded the regulatory standard of 15 pCi/L on 2/24/86 and 7/17/86. As with metal concentrations, alpha and beta activities may be correlated with turbidity of samples. Radium concentrations were below detection in all wells except GW-188, which exhibited two values slightly above detection (0.13 and 0.21 Bq/L), one of which exceeded the regulatory standard of 0.185 Bq/L.

The use of Rogers Quarry for coal ash disposal for over 20 years suggests that groundwater in the vicinity of Rogers Quarry may exhibit elevated concentrations of some constituents which are characteristic of ash disposal. Coal ashes typically exhibit considerable leachability of ash constituents such as sulfate, boron and arsenic. In addition to being readily leached from the ash, these constituents also exhibit considerable mobility in groundwater. Not surprisingly, the surface water discharge from Rogers Quarry exhibits elevated concentrations of these constituents. For example, sulfate ranges from 50 to 100 mg/L whereas arsenic and boron range from 0.1 to 0.3 mg/L. These concentrations represent about a 10-fold increase over levels expected in natural surface waters originating on the south flank of Chestnut Ridge and running through Bethel Valley. Examining the groundwater data for these same constituents indicates that sulfate (Appendix 2, Fig. 32) is elevated in all wells around Rogers Quarry, boron is elevated in all wells except GW-184 and that arsenic (Appendix 2, Figure 12) does not appear to be elevated in any wells with the possible exception of GW-188. These indications appear to be consistent with the geohydrological interpretation that the up-or down-gradient status of any well in this network is dependent on rainfall and quarry water level in a complex manner.

2.5 Summary

Hydrological data for the Rogers Quarry locality suggest that the shallow groundwater system is complex and seasonally variable. The water table in the vicinity of Rogers quarry is quite flat, with only a small hydrostatic head gradient observed across the entire site. During periods of high precipitation one well consistently has the highest hydrostatic head of the wells surrounding the quarry. During low precipitation periods, however, anyone of several wells or the quarry itself can have the highest hydrostatic head within the groundwater system surrounding the site. The data also indicate that, for several of the wells surrounding the quarry, the hydrostatic heads and the trend patterns are influenced by quarry water level fluctuations. Other wells appear to have trend patterns that behave independently of quarry water level fluctuations. The shallow and variable nature of the water table gradient suggests that groundwater flow surrounding the quarry may be sluggish and that the direction of the gradient may vary throughout the year. Rogers Quarry appears to be a recharge source into the shallow groundwater system, at least during times of low precipitation. Its role as a groundwater source or sink during times of high precipitation, and the degree and rapidity with which hydrostatic head variations noted in wells surrounding the site influence the magnitude and direction of the water table gradient cannot be evaluated with presently available data.

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APPENDIX 1

GROUNDWATER DATA FOR CY 1986

Table 1

RESULTS OF 1986 K25 GROUNDWATER SAMPLING
ROGER'S QUARRY

TOTAL METALS-RADIOACTIVITY-RADIUM
UNIT IS MG/L - UNLESS OTHERWISE STATED

WELL	GW-184 TOTAL	GW-184 TOTAL	GW-184 TOTAL	GW-184 TOTAL
DATE SAMPLED	02/25/86	04/28/86	07/14/86	10/16/86
TIME SAMPLED	15:15:00	14:10:00	12:10:00	10:45:00
METHOD	ICAP	ICAP	ICAP	ICAP
ALUMINUM	<0.02	<0.02	<0.02	0.12
ANTIMONY	.	.	<0.05	<0.05
BARIUM	0.0082	0.0087	0.011	0.018
BERYLLIUM	<0.0003	<0.0003	<0.0003	<0.0003
BORON	0.013	0.017	0.039	0.037
CADMIUM	<0.003	<0.003	<0.003	<0.003
CALCIUM	63	68	80	96
CHROMIUM	<0.01	<0.01	<0.01	0.01
COBALT	<0.005	<0.005	<0.005	<0.005
COPPER	0.0059	<0.004	<0.004	0.0046
IRON	0.04	<0.004	0.019	0.054
LITHIUM	<0.004	<0.004	<0.004	<0.004
MAGNESIUM	5.3	7.2	9.7	9.6
MANGANESE	<0.001	0.0045	0.0074	0.006
MOLYBDENUM	<0.01	<0.01	<0.01	0.016
NICKEL	<0.01	<0.01	<0.01	<0.01
NIOBIUM	<0.007	<0.007	<0.007	0.11
PHOSPHOROUS	<0.2	<0.2	<0.2	<0.2
POTASSIUM	<0.6	<0.6	1.5	2.1
SILICON	2.9	3	3.1	3.4
SILVER	<0.006	<0.006	<0.006	<0.006
SODIUM	1.3	1.5	2.2	2.1
STRONTIUM	0.077	0.12	0.14	0.21
THORIUM	<0.2	<0.2	<0.2	<0.2
TITANIUM	<0.003	<0.003	0.013	<0.003
VANADIUM	<0.005	<0.005	<0.005	<0.005
ZINC	0.024	0.027	0.0063	<0.001
ZIRCONIUM	<0.005	<0.005	0.0071	<0.005
METHOD	AAS	AAS	AAS	AAS
ARSENIC	0.007	<0.005	<0.005	<0.005
LEAD	0.004	<0.004	0.013	<0.004
SELENIUM	<0.005	<0.005	<0.005	<0.005
THALLIUM	<0.01	<0.01	<0.01	<0.01
MERCURY	<0.0002	<0.0002	<0.0002	<0.0002
ALPHA ACTIVITY (PCI/L)	1	<1	<1	<2
BETA ACTIVITY (PCI/L)	<2	2.79	<2	<2
URANIUM	0.003	1.0E-03	1.0E-03	<0.001
RADIUM (BQ/L)	<0.1	<0.1	<0.1	<0.1

RESULTS OF 1986 K25 GROUNDWATER SAMPLING
ROGER'S QUARRY

DISSOLVED METALS-RADIOACTIVITY-RADIUM
UNIT IS MG/L - UNLESS OTHERWISE STATED

WELL	GW-184 DISSOLVED	GW-184 DISSOLVED	GW-184 DISSOLVED	GW-184 DISSOLVED
DATE SAMPLED	02/25/86	04/28/86	07/14/86	10/16/86
TIME SAMPLED	15:15:00	14:10:00	12:10:00	10:45:00
METHOD	ICAP	ICAP	ICAP	ICAP
ALUMINUM	<0.02	<0.02	<0.02	0.095
ANTIMONY	.	.	<0.05	<0.05
BARIUM	0.0093	0.0087	0.011	0.017
BERYLLIUM	<0.0003	<0.0003	<0.0003	<0.0003
BORON	0.041	0.015	0.058	0.041
CADMIUM	<0.003	<0.003	<0.003	<0.003
CALCIUM	66	71	81	95
CHROMIUM	<0.01	<0.01	<0.01	<0.01
COBALT	<0.005	<0.005	<0.005	<0.005
COPPER	0.0055	<0.004	<0.004	0.0095
IRON	0.019	<0.004	0.0056	0.0073
LITHIUM	<0.004	<0.004	<0.004	<0.004
MAGNESIUM	5.5	7.5	9.7	9.6
MANGANESE	0.0053	0.0019	0.0071	0.006
MOLYBDENUM	<0.01	<0.01	<0.01	<0.01
NICKEL	<0.01	<0.01	<0.01	<0.01
NIOBIUM	<0.007	<0.007	<0.007	0.11
PHOSPHOROUS	<0.2	<0.2	<0.2	<0.2
POTASSIUM	0.87	0.66	1.4	1.8
SILICON	3.1	2.9	3.1	3.3
SILVER	<0.006	<0.006	<0.006	<0.006
SODIUM	1.5	1.6	2.2	2.1
STRONTIUM	0.08	0.12	0.14	0.22
THORIUM	<0.2	<0.2	<0.2	<0.2
TITANIUM	<0.003	<0.003	0.011	<0.003
VANADIUM	<0.005	<0.005	<0.005	<0.005
ZINC	0.033	0.0068	0.01	<0.001
ZIRCONIUM	<0.005	<0.005	0.009	<0.005
METHOD	AAS	AAS	AAS	AAS
ARSENIC	0.006	<0.005	<0.005	<0.005
LEAD	0.004	<0.004	0.01	<0.004
SELENIUM	<0.005	<0.005	<0.005	<0.005
THALLIUM	<0.01	<0.01	<0.01	<0.01
MERCURY	<0.0002	<0.0002	<0.0002	<0.0002
ALPHA ACTIVITY (PCI/L)	.	.	.	.
BETA ACTIVITY (PCI/L)	.	.	.	.
URANIUM	0.002	1.0E-03	0.003	<0.001
RADIUM (BQ/L)	.	.	.	.

RESULTS OF 1986 K25 GROUNDWATER SAMPLING
ROGER'S QUARRY

MISCELLANEOUS CONVENTIONAL AND NON-CONVENTIONAL POLLUTANTS AND RELATED PARAMET
UNIT IS MG/L - UNLESS OTHERWISE STATED

WELL	GW-184	GW-184	GW-184	GW-184
DATE SAMPLED	02/25/86	04/28/86	07/14/86	10/16/86
TIME SAMPLED	15:15:00	14:10:00	12:10:00	10:45:00
WATER LEVEL (FT +/- GRADE)	-105	-107.5	-107	-107.3
WATER TEMP (DEG. CENT.)	11.4	15.8	20.6	15.7
DISSOLVED OXYGEN	8.8	5.5	7.2	6.8
CONDUCTIVITY (IN UMHOS/CM)	330	350	430	510
PH (IN PH UNITS)	7.6	7.4	8.1	7.4
REDOX (IN MV)	257	356	195	253
ALKALINITY (CO3)	.	.	.	.
ALKALINITY (HCO3)	.	.	.	.
TOTAL SUSPENDED SOLIDS	.	.	.	.
TOTAL KJELDAHL NITROGEN	.	.	.	.
AMMONIA - N	.	.	.	.
TURBIDITY (IN NTU)	2	<1	1	1
COLIFORM (CC/100 MLS)	4	6	6	15
FLUORIDE	0.08	<0.1	0.2	0.1
PHENOLS	0.002	0.009	0.003	0.006
CHLORIDE	1.2	1.5	1.6	4.9
NITRATE NITROGEN	0.38	0.3	.	15.6
NITRATE	.	.	<0.11	.
NITRITE	.	.	.	.
SULFATE	13	24	28.1	31

RESULTS OF 1986 K25 GROUNDWATER SAMPLING
ROGER'S QUARRY

HERBICIDES AND PESTICIDES
UNIT IS UG/L

WELL	GW-184	GW-184	GW-184	GW-184
DATE SAMPLED	02/25/86	04/28/86	07/14/86	10/16/86
TIME SAMPLED	15:15:00	14:10:00	12:10:00	10:45:00
2,4-D	<1	<2	<2	<1
ENDRIN	<0.05	<0.1	<0.1	<0.05
LINDANE	<0.01	<0.02	<0.02	<0.01
METHOXYCHLOR	<0.04	<0.08	<0.08	<0.04
SILVEX	<0.1	<0.2	<0.2	<0.1
TOXAPHENE	<1	<2	<2	<1

RESULTS OF 1986 K25 GROUNDWATER SAMPLING
ROGER'S QUARRY

LAB REPLICATES
UNIT IS UG/L FOR TOX - MG/L FOR TOC

WELL	GW-184	GW-184	GW-184	GW-184
DATE SAMPLED	02/25/86	04/28/86	07/14/86	10/16/86
TIME SAMPLED	15:15:00	14:10:00	12:10:00	10:45:00
CONDUCTIVITY (IN UMHOS/CM)	378	441	424	582
	418	448	418	583
	419	449	420	584
	419	449	415	583
PH (IN PH UNITS)	7.4	7.4	7.7	7.8
	7.4	7.7	7.7	7.6
	7.4	7.7	7.6	7.8
	7.4	7.6	7.6	7.8
TOTAL ORGANIC CARBON	49	55	56	76
	46	55	53	77
	46	59	57	75
	45	60	54	68
TOTAL ORGANIC CHLORIDE	39	24	115	17
	41	94	109	12
	40	10	113	30
	33	72	110	49

RESULTS OF 1986 K25 GROUNDWATER SAMPLING
ROGER'S QUARRY

Table 2

TOTAL METALS-RADIOACTIVITY-RADIUM
UNIT IS MG/L - UNLESS OTHERWISE STATED

WELL	GW-186 TOTAL	GW-186 TOTAL	GW-186 TOTAL	GW-186 TOTAL FIELD DUPE
DATE SAMPLED	03/04/86	04/29/86	07/16/86	07/16/86
TIME SAMPLED	14:35:00	16:30:00	12:45:00	12:45:00
METHOD	ICAP	ICAP	ICAP	ICAP
ALUMINUM	0.57	0.14	0.15	0.11
ANTIMONY	.	<0.05	<0.05	<0.05
BARIUM	0.093	0.083	0.09	0.091
BERYLLIUM	<0.0003	<0.0003	<0.0003	<0.0003
BORON	0.12	0.17	0.12	0.16
CADMIUM	<0.003	<0.003	<0.003	<0.003
CALCIUM	130	120	130	130
CHROMIUM	<0.01	<0.01	<0.01	<0.01
COBALT	<0.005	<0.005	<0.005	<0.005
COPPER	<0.004	<0.004	<0.004	<0.004
IRON	1.9	0.96	1.3	1.2
LITHIUM	0.042	0.029	0.028	0.028
MAGNESIUM	29	26	29	30
MANGANESE	0.43	0.32	0.34	0.34
MOLYBDENUM	<0.01	<0.01	<0.01	<0.01
NICKEL	<0.01	<0.01	<0.01	<0.01
NIOBIUM	<0.007	<0.007	<0.007	<0.007
PHOSPHOROUS	<0.2	<0.2	0.21	0.29
POTASSIUM	14	6.2	5.4	4.9
SILICON	5.5	6.4	5.6	5.5
SILVER	<0.006	<0.006	<0.006	<0.006
SODIUM	34	30	31	31
STRONTIUM	1.4	1.5	1.4	1.4
THORIUM	<0.2	<0.2	<0.2	<0.2
TITANIUM	<0.003	<0.003	0.024	0.018
VANADIUM	<0.005	<0.005	<0.005	<0.005
ZINC	0.0066	0.0075	0.0072	0.0059
ZIRCONIUM	<0.005	<0.005	<0.005	<0.005
METHOD	AAS	AAS	AAS	AAS
ARSENIC	<0.005	<0.005	<0.005	<0.005
LEAD	0.004	<0.004	0.016	0.007
SELENIUM	<0.005	<0.005	<0.005	<0.005
THALLIUM	<0.01	<0.01	<0.01	<0.01
MERCURY	<0.0002	<0.0002	<0.0002	<0.0002
ALPHA ACTIVITY (PCI/L)	<1	<1.5	<1	<1
BETA ACTIVITY (PCI/L)	9	<3.5	<2	4
URANIUM	0.002	1.0E-03	1.0E-03	<0.001
RADIUM (BQ/L)	<0.1	<0.1	<0.1	<0.1

RESULTS OF 1986 K25 GROUNDWATER SAMPLING
ROGER'S QUARRY

TOTAL METALS-RADIOACTIVITY-RADIUM
UNIT IS MG/L - UNLESS OTHERWISE STATED

WELL	GW-186 TOTAL	GW-186 TOTAL FIELD DUPE
DATE SAMPLED	10/22/86	10/22/86
TIME SAMPLED	15:30:00	15:30:00
METHOD	ICAP	ICAP
ALUMINUM	0.13	0.13
ANTIMONY	<0.05	<0.05
BARIUM	0.1	0.1
BERYLLIUM	<0.0003	<0.0003
BORON	0.17	0.14
CADMIUM	<0.003	<0.003
CALCIUM	110	110
CHROMIUM	<0.01	<0.01
COBALT	<0.005	<0.005
COPPER	<0.004	<0.004
IRON	1.2	1.3
LITHIUM	0.037	0.031
MAGNESIUM	29	30
MANGANESE	0.26	0.26
MOLYBDENUM	<0.01	<0.01
NICKEL	<0.01	<0.01
NIOBIUM	<0.007	<0.007
PHOSPHOROUS	<0.2	<0.2
POTASSIUM	6.5	5.2
SILICON	5.4	5.4
SILVER	<0.006	<0.006
SODIUM	36	36
STRONTIUM	1.5	1.5
THORIUM	<0.2	<0.2
TITANIUM	<0.003	<0.003
VANADIUM	<0.005	<0.005
ZINC	0.003	0.0031
ZIRCONIUM	<0.005	<0.005
METHOD	AAS	AAS
ARSENIC	<0.005	<0.005
LEAD	0.004	<0.004
SELENIUM	<0.005	<0.005
THALLIUM	<0.01	<0.01
MERCURY	<0.0002	<0.0002
ALPHA ACTIVITY (PCI/L)	<2	2
BETA ACTIVITY (PCI/L)	10	6
URANIUM	0.003	0.016
RADIUM (BQ/L)	<0.1	<0.1

RESULTS OF 1986 K25 GROUNDWATER SAMPLING
ROGER'S QUARRY

DISSOLVED METALS-RADIOACTIVITY-RADIUM
UNIT IS MG/L - UNLESS OTHERWISE STATED

WELL	GW-186 DISSOLVED	GW-186 DISSOLVED	GW-186 DISSOLVED	GW-186 DISSOLVED FIELD DUPE
DATE SAMPLED	03/04/86	04/29/86	07/16/86	07/16/86
TIME SAMPLED	14:35:00	16:30:00	12:45:00	12:45:00
METHOD	ICAP	ICAP	ICAP	ICAP
ALUMINUM	<0.02	<0.02	<0.02	<0.02
ANTIMONY	.	<0.05	<0.05	<0.05
BARIUM	0.079	0.077	0.086	0.086
BERYLLIUM	<0.0003	<0.0003	4.0E-04	4.0E-04
BORON	0.14	0.12	0.12	0.12
CADMIUM	<0.003	<0.003	<0.003	<0.003
CALCIUM	120	110	120	120
CHROMIUM	<0.01	<0.01	<0.01	<0.01
COBALT	<0.005	<0.005	<0.005	<0.005
COPPER	0.0076	<0.004	<0.004	<0.004
IRON	0.91	0.52	0.71	0.81
LITHIUM	0.03	0.029	0.027	0.026
MAGNESIUM	29	27	30	29
MANGANESE	0.4	0.3	0.33	0.33
MOLYBDENUM	<0.01	<0.01	<0.01	<0.01
NICKEL	<0.01	<0.01	<0.01	<0.01
NIOBIUM	<0.007	<0.007	<0.007	<0.007
PHOSPHOROUS	<0.2	<0.2	0.27	0.3
POTASSIUM	9.1	6.8	5.4	4.6
SILICON	5.6	6	5.2	5.1
SILVER	<0.006	<0.006	<0.006	<0.006
SODIUM	31	32	31	30
STRONTIUM	1.3	1.4	1.4	1.3
THORIUM	<0.2	<0.2	<0.2	<0.2
TITANIUM	<0.003	<0.003	0.019	0.022
VANADIUM	<0.005	<0.005	<0.005	<0.005
ZINC	0.0016	0.0064	0.014	0.016
ZIRCONIUM	<0.005	<0.005	<0.005	<0.005
METHOD	AAS	AAS	AAS	AAS
ARSENIC	<0.005	<0.005	<0.005	<0.005
LEAD	<0.004	<0.004	0.008	0.006
SELENIUM	<0.005	<0.005	<0.005	<0.005
THALLIUM	<0.01	<0.01	<0.01	<0.01
MERCURY	<0.0002	<0.0002	<0.0002	<0.0002
ALPHA ACTIVITY (PCI/L)	.	.	.	.
BETA ACTIVITY (PCI/L)	.	.	.	.
URANIUM	0.002	1.0E-03	<0.001	<0.001
RADIUM (BQ/L)	.	.	.	.

RESULTS OF 1986 K25 GROUNDWATER SAMPLING
ROGER'S QUARRY

DISSOLVED METALS-RADIOACTIVITY-RADIUM
UNIT IS MG/L - UNLESS OTHERWISE STATED

WELL	GW-186 DISSOLVED	GW-186 DISSOLVED FIELD DUPE
DATE SAMPLED	10/22/86	10/22/86
TIME SAMPLED	15:30:00	15:30:00
METHOD	ICAP	ICAP
ALUMINUM	0.053	0.046
ANTIMONY	<0.05	<0.05
BARIUM	0.1	0.1
BERYLLIUM	<0.0003	<0.0003
BORON	0.15	0.16
CADMIUM	<0.003	<0.003
CALCIUM	110	110
CHROMIUM	0.013	<0.01
COBALT	<0.005	<0.005
COPPER	<0.004	<0.004
IRON	0.54	0.34
LITHIUM	0.032	0.033
MAGNESIUM	29	29
MANGANESE	0.3	0.25
MOLYBDENUM	<0.01	0.012
NICKEL	<0.01	<0.01
NIOBIUM	<0.007	<0.007
PHOSPHOROUS	<0.2	<0.2
POTASSIUM	5.4	5.6
SILICON	5.2	5.4
SILVER	<0.006	<0.006
SODIUM	36	36
STRONTIUM	1.5	1.5
THORIUM	<0.2	<0.2
TITANIUM	<0.003	<0.003
VANADIUM	<0.005	<0.005
ZINC	0.003	0.0043
ZIRCONIUM	<0.005	0.0079
METHOD	AAS	AAS
ARSENIC	<0.005	<0.005
LEAD	<0.004	<0.004
SELENIUM	<0.005	<0.005
THALLIUM	<0.01	<0.01
MERCURY	<0.0002	<0.0002
ALPHA ACTIVITY (PCI/L)	.	.
BETA ACTIVITY (PCI/L)	.	.
URANIUM	0.002	0.005
RADIUM (BQ/L)	.	.

RESULTS OF 1986 K25 GROUNDWATER SAMPLING
ROGER'S QUARRY

MISCELLANEOUS CONVENTIONAL AND NON-CONVENTIONAL POLLUTANTS AND RELATED PARAMETE
UNIT IS MG/L - UNLESS OTHERWISE STATED

WELL	GW-186	GW-186	GW-186	GW-186 FIELD DUPE
DATE SAMPLED	03/04/86	04/29/86	07/16/86	07/16/86
TIME SAMPLED	14:35:00	16:30:00	12:45:00	12:45:00
WATER LEVEL (FT +/- GRADE)	-11.5	-11	-11	.
WATER TEMP (DEG. CENT.)	13	22.5	23.4	.
DISSOLVED OXYGEN	2.1	5.2	2	.
CONDUCTIVITY (IN UMHOS/CM)	730	780	720	.
PH (IN PH UNITS)	7.3	7.5	7.5	.
REDOX (IN MV)	-40	-37.4	-51	.
ALKALINITY (CO3)	.	.	.	.
ALKALINITY (HCO3)	.	.	.	.
TOTAL SUSPENDED SOLIDS	.	.	.	.
TOTAL KJELDAHL NITROGEN	.	.	.	.
AMMONIA - N	.	.	.	.
TURBIDITY (IN NTU)	41	38	16	12
COLIFORM (CC/100 MLS)	N	N	N	N
FLUORIDE	0.289	0.3	0.2	0.2
PHENOLS	1.0E-03	<0.001	1.0E-03	0.002
CHLORIDE	14	15.6	19.1	19.1
NITRATE NITROGEN	<0.11	<0.11	<0.11	<0.11
NITRATE	.	.	.	.
NITRITE	.	.	.	.
SULFATE	68	66	63	64

RESULTS OF 1986 K25 GROUNDWATER SAMPLING
ROGER'S QUARRY

MISCELLANEOUS CONVENTIONAL AND NON-CONVENTIONAL POLLUTANTS AND RELATED PARAMET
UNIT IS MG/L - UNLESS OTHERWISE STATED

WELL	GW-186	GW-186 FIELD DUPE
DATE SAMPLED	10/22/86	10/22/86
TIME SAMPLED	15:30:00	15:30:00
WATER LEVEL (FT +/- GRADE)	-9	.
WATER TEMP (DEG. CENT.)	16.6	.
DISSOLVED OXYGEN	8.1	.
CONDUCTIVITY (IN UMHOS/CM)	750	.
PH (IN PH UNITS)	7.4	.
REDOX (IN MV)	-37	.
ALKALINITY (CO3)	.	.
ALKALINITY (HCO3)	.	.
TOTAL SUSPENDED SOLIDS	.	.
TOTAL KJELDAHL NITROGEN	.	.
AMMONIA - N	.	.
TURBIDITY (IN NTU)	17	17
COLIFORM (CC/100 MLS)	N	N
FLUORIDE	0.1	0.1
PHENOLS	0.012	0.036
CHLORIDE	17	17
NITRATE NITROGEN	<0.11	<0.11
NITRATE	.	.
NITRITE	.	.
SULFATE	63	63

RESULTS OF 1986 K25 GROUNDWATER SAMPLING
ROGER'S QUARRY

HERBICIDES AND PESTICIDES
UNIT IS UG/L

WELL	GW-186	GW-186	GW-186	GW-186 FIELD DUPE
DATE SAMPLED	03/04/86	04/29/86	07/16/86	07/16/86
TIME SAMPLED	14:35:00	16:30:00	12:45:00	12:45:00
2,4-D	<1	<2	<2	<2
ENDRIN	<0.05	<0.1	<0.1	<0.1
LINDANE	<0.01	<0.02	<0.02	<0.02
METHOXYCHLOR	<0.04	<0.08	<0.08	<0.08
SILVEX	<0.1	<0.2	<0.2	<0.2
TOXAPHENE	<1	<2	<2	<2

RESULTS OF 1986 K25 GROUNDWATER SAMPLING
ROGER'S QUARRY

HERBICIDES AND PESTICIDES
UNIT IS UG/L

WELL	GW-186	GW-186 FIELD DUPE
DATE SAMPLED	10/22/86	10/22/86
TIME SAMPLED	15:30:00	15:30:00
2,4-D	<1	<1
ENDRIN	<0.05	<0.05
LINDANE	<0.01	<0.01
METHOXYCHLOR	<0.04	<0.04
SILVEX	<0.1	<0.1
TOXAPHENE	<1	<1

RESULTS OF 1986 K25 GROUNDWATER SAMPLING
ROGER'S QUARRY

LAB REPLICATES
UNIT IS UG/L FOR TOX - MG/L FOR TOC

WELL	GW-186	GW-186	GW-186	GW-186 FIELD DUPE
DATE SAMPLED	03/04/86	04/29/86	07/16/86	07/16/86
TIME SAMPLED	14:35:00	16:30:00	12:45:00	12:45:00
CONDUCTIVITY (IN UMHOS/CM)	786	824	806	810
	833	830	810	812
	838	831	811	812
	841	831	812	813
PH (IN PH UNITS)	7.1	7.2	7.2	7.2
	7.2	7.3	7.2	7.2
	7.3	7.2	7.2	7.2
	7.1	7.2	7.2	7.2
TOTAL ORGANIC CARBON	120	123	104	111
	110	117	111	114
	120	126	107	115
	115	126	117	105
TOTAL ORGANIC CHLORIDE	26	9	25	21
	29	18	26	23
	26	170	23	25
	34	28	25	23

RESULTS OF 1986 K25 GROUNDWATER SAMPLING
ROGER'S QUARRY

LAB REPLICATES
UNIT IS UG/L FOR TOX - MG/L FOR TOC

WELL	GW-186	GW-186 FIELD DUPE
DATE SAMPLED	10/22/86	10/22/86
TIME SAMPLED	15:30:00	15:30:00
CONDUCTIVITY (IN UMHOS/CM)	772	760
	775	757
	775	755
	776	756
PH (IN PH UNITS)	7.3	7.4
	7.4	7.5
	7.5	7.5
	7.5	7.5
TOTAL ORGANIC CARBON	125	133
	115	142
	125	128
	120	130
TOTAL ORGANIC CHLORIDE	135	68
	86	48
	133	97
	121	80

RESULTS OF 1986 K25 GROUNDWATER SAMPLING
ROGER'S QUARRY

Table 3

TOTAL METALS-RADIOACTIVITY-RADIUM
UNIT IS MG/L - UNLESS OTHERWISE STATED

WELL	GW-187 TOTAL	GW-187 TOTAL	GW-187 TOTAL	GW-187 TOTAL
DATE SAMPLED	03/03/86	04/28/86	07/16/86	10/21/86
TIME SAMPLED	15:05:00	15:00:00	12:05:00	14:30:00
METHOD	ICAP	ICAP	ICAP	ICAP
ALUMINUM	0.045	<0.02	<0.02	0.022
ANTIMONY	.	.	<0.05	<0.05
BARIUM	0.12	0.11	0.11	0.15
BERYLLIUM	<0.0003	<0.0003	<0.0003	<0.0003
BORON	0.36	0.36	0.38	0.48
CADMIUM	<0.003	<0.003	<0.003	<0.003
CALCIUM	51	48	59	58
CHROMIUM	<0.01	<0.01	<0.01	<0.01
COBALT	<0.005	<0.005	<0.005	<0.005
COPPER	<0.004	<0.004	<0.004	<0.004
IRON	0.063	0.097	0.046	0.047
LITHIUM	0.087	0.099	0.11	0.14
MAGNESIUM	20	16	17	19
MANGANESE	0.0052	0.0037	<0.001	0.0033
MOLYBDENUM	<0.01	<0.01	0.017	<0.01
NICKEL	<0.01	<0.01	<0.01	<0.01
NIOBIUM	<0.007	<0.007	<0.007	<0.007
PHOSPHOROUS	<0.2	<0.2	<0.2	<0.2
POTASSIUM	<0.6	<0.6	1.4	1.3
SILICON	3.4	3.4	3.1	3.5
SILVER	<0.006	<0.006	<0.006	<0.006
SODIUM	21	16	14	38
STRONTIUM	0.67	0.6	0.55	0.65
THORIUM	<0.2	<0.2	<0.2	<0.2
TITANIUM	<0.003	<0.003	0.02	<0.003
VANADIUM	<0.005	<0.005	<0.005	<0.005
ZINC	0.01	0.0011	0.013	<0.001
ZIRCONIUM	<0.005	<0.005	<0.005	<0.005
METHOD	AAS	AAS	AAS	AAS
ARSENIC	<0.005	<0.005	<0.005	<0.005
LEAD	0.005	<0.004	0.005	0.013
SELENIUM	<0.005	<0.005	<0.005	<0.005
THALLIUM	<0.01	<0.01	<0.01	<0.01
MERCURY	<0.0002	<0.0002	<0.0002	<0.0002
ALPHA ACTIVITY (PCI/L)	11.5	1.34	<1	<2
BETA ACTIVITY (PCI/L)	13.3	<2	<2	<2
URANIUM	0.002	1.0E-03	<0.001	0.003
RADIUM (BQ/L)	<0.1	<0.1	<0.1	<0.1

RESULTS OF 1986 K25 GROUNDWATER SAMPLING
ROGER'S QUARRY

DISSOLVED METALS-RADIOACTIVITY-RADIUM
UNIT IS MG/L - UNLESS OTHERWISE STATED

WELL	GW-187 DISSOLVED	GW-187 DISSOLVED	GW-187 DISSOLVED	GW-187 DISSOLVED
DATE SAMPLED	03/03/86	04/28/86	07/16/86	10/21/86
TIME SAMPLED	15:05:00	15:00:00	12:05:00	14:30:00
METHOD	ICAP	ICAP	ICAP	ICAP
ALUMINUM	<0.02	<0.02	<0.02	0.04
ANTIMONY	.	.	<0.05	<0.05
BARIUM	0.13	0.12	0.12	0.15
BERYLLIUM	<0.0003	<0.0003	<0.0003	<0.0003
BORON	0.34	0.35	0.4	0.47
CADMIUM	<0.003	<0.003	<0.003	<0.003
CALCIUM	55	49	62	55
CHROMIUM	<0.01	<0.01	<0.01	<0.01
COBALT	<0.005	<0.005	<0.005	<0.005
COPPER	<0.004	<0.004	<0.004	<0.004
IRON	0.043	0.007	0.047	0.087
LITHIUM	0.088	0.1	0.12	0.14
MAGNESIUM	21	17	18	18
MANGANESE	0.0051	0.0019	<0.001	0.0037
MOLYBDENUM	<0.01	0.011	0.016	0.013
NICKEL	<0.01	<0.01	<0.01	<0.01
NIOBIUM	<0.007	<0.007	<0.007	<0.007
PHOSPHOROUS	<0.2	<0.2	0.28	<0.2
POTASSIUM	0.7	<0.6	1.3	1.6
SILICON	3.5	3.3	3.2	3.3
SILVER	<0.006	<0.006	<0.006	<0.006
SODIUM	21	17	15	37
STRONTIUM	0.68	0.63	0.58	0.65
THORIUM	<0.2	<0.2	<0.2	<0.2
TITANIUM	<0.003	<0.003	0.016	<0.003
VANADIUM	<0.005	<0.005	<0.005	<0.005
ZINC	0.0036	1.0E-03	0.0075	<0.001
ZIRCONIUM	<0.005	<0.005	<0.005	<0.005
METHOD	AAS	AAS	AAS	AAS
ARSENIC	<0.005	<0.005	<0.005	<0.005
LEAD	<0.004	<0.004	0.006	<0.004
SELENIUM	<0.005	<0.005	<0.005	<0.005
THALLIUM	<0.01	<0.01	<0.01	<0.01
MERCURY	<0.0002	<0.0002	<0.0002	<0.0002
ALPHA ACTIVITY (PCI/L)	.	.	.	.
BETA ACTIVITY (PCI/L)	.	.	.	.
URANIUM	0.002	0.003	<0.001	0.004
RADIUM (BQ/L)	.	.	.	.

RESULTS OF 1986 K25 GROUNDWATER SAMPLING
ROGER'S QUARRY

MISCELLANEOUS CONVENTIONAL AND NON-CONVENTIONAL POLLUTANTS AND RELATED PARAMET

UNIT IS MG/L - UNLESS OTHERWISE STATED

WELL	GW-187	GW-187	GW-187	GW-187
DATE SAMPLED	03/03/86	04/28/86	07/16/86	10/21/86
TIME SAMPLED	15:05:00	15:00:00	12:05:00	14:30:00
WATER LEVEL (FT +/- GRADE)	-15.4	-16.8	-43	-16.8
WATER TEMP (DEG. CENT.)	17.6	18	22.4	16.4
DISSOLVED OXYGEN	3.1	6.8	5.1	4.8
CONDUCTIVITY (IN UMHOS/CM)	450	440	470	500
PH (IN PH UNITS)	8.1	8.1	7.9	7.2
REDOX (IN MV)	-167	-86.2	-138	-229
ALKALINITY (CO3)	.	.	.	.
ALKALINITY (HCO3)	.	.	.	.
TOTAL SUSPENDED SOLIDS	.	.	.	.
TOTAL KJELDAHL NITROGEN	.	.	.	.
AMMONIA - N	.	.	.	.
TURBIDITY (IN NTU)	2	<1	<1	1
COLIFORM (CC/100 MLS)	N	N	N	N
FLUORIDE	0.4	0.5	0.5	0.2
PHENOLS	<0.001	<0.002	1.0E-03	0.002
CHLORIDE	7.1	6.6	6.4	25
NITRATE NITROGEN	<0.11	<0.11	<0.11	<0.11
NITRATE	.	.	.	.
NITRITE	.	.	.	.
SULFATE	57	65	67	66

RESULTS OF 1986 K25 GROUNDWATER SAMPLING
ROGER'S QUARRY

HERBICIDES AND PESTICIDES
UNIT IS UG/L

WELL	GW-187	GW-187	GW-187	GW-187
DATE SAMPLED	03/03/86	04/28/86	07/16/86	10/21/86
TIME SAMPLED	15:05:00	15:00:00	12:05:00	14:30:00
2,4-D	<1	<2	<2	<1
ENDRIN	<0.05	<0.1	<0.1	<0.05
LINDANE	<0.01	<0.02	<0.02	<0.01
METHOXYCHLOR	<0.04	<0.08	<0.08	<0.04
SILVEX	<0.1	<0.2	<0.2	<0.1
TOXAPHENE	<1	<2	<2	<1

RESULTS OF 1986 K25 GROUNDWATER SAMPLING
ROGER'S QUARRY

LAB REPLICATES
UNIT IS UG/L FOR TOX - MG/L FOR TOC

WELL	GW-187	GW-187	GW-187	GW-187
DATE SAMPLED	03/03/86	04/28/86	07/16/86	10/21/86
TIME SAMPLED	15:05:00	15:00:00	12:05:00	14:30:00
CONDUCTIVITY (IN UMHOS/CM)	489	504	457	566
	497	508	462	570
	497	512	464	568
	499	513	466	567
PH (IN PH UNITS)	7.6	8.1	7.7	7.8
	7.6	8	7.7	7.8
	7.6	7.9	7.7	7.8
	7.6	8.1	7.7	7.8
TOTAL ORGANIC CARBON	49	53	41	10
	44	51	46	12
	44	54	45	11
	44	54	43	11
TOTAL ORGANIC CHLORIDE	23	64	22	90
	23	125	21	105
	18	32	25	76
	21	42	26	81

RESULTS OF 1986 K25 GROUNDWATER SAMPLING
ROGER'S QUARRY

Table 4

TOTAL METALS-RADIOACTIVITY-RADIUM
UNIT IS MG/L - UNLESS OTHERWISE STATED

WELL	GW-188 TOTAL	GW-188 TOTAL	GW-188 TOTAL	GW-188 TOTAL	GW-188 TOTAL
DATE SAMPLED	02/24/86	04/28/86	07/17/86	10/16/86	10/17/86
TIME SAMPLED	16:55:00	11:30:00	10:15:00	14:50:00	16:00:00
METHOD	ICAP	ICAP	ICAP	ICAP	ICAP
ALUMINUM	7.7	2.5	6.2	21	1.6
ANTIMONY	.	.	<0.05	<0.05	<0.05
BARIUM	0.085	0.15	0.092	0.32	0.058
BERYLLIUM	<0.0003	0.0012	7.0E-04	0.0044	<0.0003
BORON	0.12	0.12	0.15	0.16	0.14
CADMIUM	<0.003	<0.003	0.0035	<0.003	<0.003
CALCIUM	35	43	42	48	36
CHROMIUM	<0.01	<0.01	<0.01	0.05	<0.01
COBALT	<0.005	<0.005	0.0079	0.023	<0.005
COPPER	<0.004	<0.004	<0.004	0.044	<0.004
IRON	12	3.3	8.2	38	2.2
LITHIUM	0.027	0.018	0.026	0.052	0.021
MAGNESIUM	27	24	26	20	26
MANGANESE	1	2.8	1.3	6.1	0.64
MOLYBDENUM	<0.01	<0.01	<0.01	0.021	<0.01
NICKEL	<0.01	<0.01	<0.01	0.044	<0.01
NIOBIUM	<0.007	<0.007	<0.007	0.11	<0.007
PHOSPHOROUS	<0.2	<0.2	0.29	0.74	<0.2
POTASSIUM	15	6.6	5.3	8.3	3.4
SILICON	13	7	13	26	6.5
SILVER	<0.006	<0.006	<0.006	<0.006	<0.006
SODIUM	19	20	18	55	18
STRONTIUM	1.8	1.8	1.8	1.4	1.9
THORIUM	<0.2	<0.2	<0.2	<0.2	<0.2
TITANIUM	0.077	0.01	0.15	0.12	0.0085
VANADIUM	<0.005	<0.005	0.0087	0.034	<0.005
ZINC	0.073	0.07	0.065	0.26	0.02
ZIRCONIUM	<0.005	<0.005	0.0052	<0.005	<0.005
METHOD	AAS	AAS	AAS	AAS	AAS
ARSENIC	0.059	0.028	<0.005	0.017	<0.005
LEAD	0.008	0.022	0.014	0.084	0.007
SELENIUM	<0.005	<0.005	<0.005	<0.005	<0.005
THALLIUM	<0.01	<0.01	<0.01	<0.01	<0.01
MERCURY	<0.0002	<0.0002	<0.0002	2.0E-04	<0.0002
ALPHA ACTIVITY (PCI/L)	20	<1	21	<2	<2
BETA ACTIVITY (PCI/L)	36	4.59	27	<2	4
URANIUM	0.002	0.004	<0.001	0.002	0.002
RADIUM (BQ/L)	<0.1	0.13	0.21	<0.1	<0.1

RESULTS OF 1986 K25 GROUNDWATER SAMPLING
ROGER'S QUARRY

DISSOLVED METALS-RADIOACTIVITY-RADIUM
UNIT IS MG/L - UNLESS OTHERWISE STATED

WELL	GW-188 DISSOLVED	GW-188 DISSOLVED	GW-188 DISSOLVED	GW-188 DISSOLVED	GW-188 DISSOLVED
DATE SAMPLED	02/24/86	04/28/86	07/17/86	10/16/86	10/20/86
TIME SAMPLED	16:55:00	11:30:00	10:15:00	14:50:00	16:00:00
METHOD	ICAP	ICAP	ICAP	ICAP	ICAP
ALUMINUM	0.031	<0.02	1.6	0.06	0.04
ANTIMONY	.	.	<0.05	<0.05	<0.05
BARIUM	0.037	0.015	0.12	0.027	0.022
BERYLLIUM	<0.0003	<0.0003	8.0E-04	<0.0003	<0.0003
BORON	0.26	0.13	0.13	0.15	0.14
CADMIUM	<0.003	<0.003	0.0041	<0.003	<0.003
CALCIUM	27	21	41	33	35
CHROMIUM	<0.01	<0.01	<0.01	<0.01	<0.01
COBALT	<0.005	<0.005	0.01	<0.005	<0.005
COPPER	0.0064	<0.004	0.098	<0.004	<0.004
IRON	0.021	<0.004	1.6	0.0053	0.014
LITHIUM	0.022	0.023	0.02	0.018	0.018
MAGNESIUM	22	15	22	23	22
MANGANESE	0.34	0.13	2	0.061	0.15
MOLYBDENUM	<0.01	0.011	0.012	<0.01	<0.01
NICKEL	<0.01	<0.01	0.016	<0.01	<0.01
NIOBIUM	<0.007	<0.007	<0.007	0.11	<0.007
PHOSPHOROUS	<0.2	<0.2	0.34	<0.2	<0.2
POTASSIUM	22	14	5.8	4.3	3.9
SILICON	4.9	4	5.1	5.1	4.8
SILVER	<0.006	<0.006	<0.006	<0.006	<0.006
SODIUM	22	46	24	22	23
STRONTIUM	1.5	0.93	1.4	1.8	1.4
THORIUM	<0.2	<0.2	<0.2	<0.2	<0.2
TITANIUM	<0.003	<0.003	0.017	<0.003	<0.003
VANADIUM	<0.005	<0.005	<0.005	<0.005	<0.005
ZINC	0.0011	<0.001	0.074	<0.001	0.0051
ZIRCONIUM	<0.005	<0.005	<0.005	<0.005	<0.005
METHOD	AAS	AAS	AAS	AAS	AAS
ARSENIC	0.008	<0.005	0.006	<0.005	<0.005
LEAD	0.008	0.004	0.02	<0.004	0.005
SELENIUM	<0.005	<0.005	<0.005	<0.005	<0.005
THALLIUM	<0.01	<0.01	<0.01	<0.01	<0.01
MERCURY	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
ALPHA ACTIVITY (PCI/L)	.	.	.	.	.
BETA ACTIVITY (PCI/L)	.	.	.	.	.
URANIUM	1.0E-03	0.002	0.002	1.0E-03	0.003
RADIUM (BQ/L)	.	.	.	.	.

RESULTS OF 1986 K25 GROUNDWATER SAMPLING
ROGER'S QUARRY

MISCELLANEOUS CONVENTIONAL AND NON-CONVENTIONAL POLLUTANTS AND RELATED PARAMET[E]
UNIT IS MG/L - UNLESS OTHERWISE STATED

WELL	GW-188	GW-188	GW-188	GW-188	GW-188
DATE SAMPLED	02/24/86	04/28/86	07/17/86	10/16/86	10/17/86
TIME SAMPLED	16:55:00	11:30:00	10:15:00	14:50:00	16:00:00
WATER LEVEL (FT +/- GRADE)	-16.4	-17.1	-17	-17.2	-17
WATER TEMP (DEG. CENT.)	13.5	18.2	23	15.7	21
DISSOLVED OXYGEN	5	10.6	6.2	11.6	8.2
CONDUCTIVITY (IN UMHOS/CM)	410	440	410	400	430
PH (IN PH UNITS)	8.1	8.5	7.8	7.7	8.14
REDOX (IN MV)	-138	239	216	260	222
ALKALINITY (CO3)	.	.	.	.	.
ALKALINITY (HCO3)	.	.	.	.	.
TOTAL SUSPENDED SOLIDS	.	.	.	.	.
TOTAL KJELDAHL NITROGEN	.	.	.	.	.
AMMONIA - N	.	.	.	.	.
TURBIDITY (IN NTU)	G	G	G	114	155
COLIFORM (CC/100 MLS)	N	N	N	N	N
FLUORIDE	0.52	0.6	0.7	0.5	0.4
PHENOLS	<0.001	<0.002	0.1	<0.001	1.0E-03
CHLORIDE	3.8	7.6	8.2	7.4	7.1
NITRATE NITROGEN	<0.11	<0.11	<0.11	<0.11	<0.11
NITRATE	.	.	.	.	.
NITRITE	.	.	.	.	.
SULFATE	26	33	33	33	27

RESULTS OF 1986 K25 GROUNDWATER SAMPLING
ROGER'S QUARRY

HERBICIDES AND PESTICIDES
UNIT IS UG/L

WELL	GW-188	GW-188	GW-188	GW-188	GW-188
DATE SAMPLED	02/24/86	04/28/86	07/17/86	10/16/86	10/17/86
TIME SAMPLED	16:55:00	11:30:00	10:15:00	14:50:00	16:00:00
2,4-D	<1	<2	<2	<1	<1
ENDRIN	<0.05	<0.1	<0.1	<0.05	<0.05
LINDANE	<0.01	<0.02	<0.02	<0.01	<0.01
METHOXYCHLOR	<0.04	<0.08	<0.08	<0.04	<0.04
SILVEX	<0.1	<0.2	<0.2	<0.1	<0.1
TOXAPHENE	<1	<2	<2	<1	<1

RESULTS OF 1986 K25 GROUNDWATER SAMPLING
ROGER'S QUARRY

LAB REPLICATES
UNIT IS UG/L FOR TOX - MG/L FOR TOC

WELL	GW-188	GW-188	GW-188	GW-188	GW-188
DATE SAMPLED	02/24/86	04/28/86	07/17/86	10/16/86	10/17/86
TIME SAMPLED	16:55:00	11:30:00	10:15:00	14:50:00	16:00:00
CONDUCTIVITY (IN UMHOS/CM)	463	507	454	459	442
	397	483	454	461	440
	505	482	489	465	441
	508	482	462	467	444
PH (IN PH UNITS)	7.8	8.1	8	8	8
	8.4	7.9	8	8	8
	8.5	8.1	7.9	8	8
	8.5	8.1	8	8	8
TOTAL ORGANIC CARBON	47	65	15	51	62
	46	61	84	60	60
	44	66	88	60	60
	48	63	84	59	61
TOTAL ORGANIC CHLORIDE	14	86	27	19	21
	15	.	26	14	18
	15	.	22	15	<10
	14	75	23	16	<10

RESULTS OF 1986 K25 GROUNDWATER SAMPLING
ROGER'S QUARRY

Table 5

TOTAL METALS-RADIOACTIVITY-RADIUM
UNIT IS MG/L - UNLESS OTHERWISE STATED

WELL	GW-189 TOTAL	GW-189 TOTAL	GW-189 TOTAL	GW-189 TOTAL
DATE SAMPLED	03/04/86	05/01/86	07/15/86	10/21/86
TIME SAMPLED	15:25:00	14:00:00	12:30:00	.
METHOD	ICAP	ICAP	ICAP	ICAP
ALUMINUM	<0.02	<0.02	0.096	0.037
ANTIMONY	.	<0.05	<0.05	<0.05
BARIUM	0.064	0.064	0.076	0.092
BERYLLIUM	<0.0003	<0.0003	<0.0003	<0.0003
BORON	0.34	0.32	0.23	0.47
CADMIUM	<0.003	<0.003	<0.003	<0.003
CALCIUM	44	36	59	44
CHROMIUM	<0.01	<0.01	<0.01	<0.01
COBALT	<0.005	<0.005	<0.005	<0.005
COPPER	0.0067	<0.004	<0.004	<0.004
IRON	0.21	0.22	1.1	0.71
LITHIUM	0.15	0.14	0.14	0.16
MAGNESIUM	15	14	17	16
MANGANESE	0.088	0.054	0.11	0.1
MOLYBDENUM	<0.01	<0.01	<0.01	<0.01
NICKEL	<0.01	<0.01	<0.01	<0.01
NIOBIUM	<0.007	<0.007	<0.007	<0.007
PHOSPHOROUS	<0.2	<0.2	<0.2	<0.2
POTASSIUM	28	20	24	6.2
SILICON	4.9	5.8	5.6	4.9
SILVER	<0.006	<0.006	<0.006	<0.006
SODIUM	170	170	120	200
STRONTIUM	0.98	0.97	1.1	1.1
THORIUM	<0.2	<0.2	<0.2	<0.2
TITANIUM	<0.003	<0.003	0.027	<0.003
VANADIUM	<0.005	<0.005	<0.005	<0.005
ZINC	0.0037	0.0021	0.054	<0.001
ZIRCONIUM	<0.005	<0.005	0.006	0.011
METHOD	AAS	AAS	AAS	AAS
ARSENIC	<0.005	<0.005	<0.005	<0.005
LEAD	<0.004	<0.004	0.035	0.009
SELENIUM	<0.005	<0.005	<0.005	<0.005
THALLIUM	<0.01	<0.01	<0.01	<0.01
MERCURY	<0.0002	<0.0002	<0.0002	<0.0002
ALPHA ACTIVITY (PCI/L)	3	1.16	2	3
BETA ACTIVITY (PCI/L)	16	20.41	19	5
URANIUM	0.006	0.002	1.0E-03	0.004
RADIUM (BQ/L)	<0.1	<0.1	<0.1	<0.1

RESULTS OF 1986 K25 GROUNDWATER SAMPLING
ROGER'S QUARRY

DISSOLVED METALS-RADIOACTIVITY-RADIUM
UNIT IS MG/L - UNLESS OTHERWISE STATED

WELL	GW-189 DISSOLVED	GW-189 DISSOLVED	GW-189 DISSOLVED	GW-189 DISSOLVED
DATE SAMPLED	03/04/86	05/01/86	07/15/86	10/21/86
TIME SAMPLED	15:25:00	14:00:00	12:30:00	.
METHOD	ICAP	ICAP	ICAP	ICAP
ALUMINUM	<0.02	<0.02	<0.02	0.12
ANTIMONY	.	<0.05	<0.05	<0.05
BARIUM	0.059	0.056	0.047	0.11
BERYLLIUM	<0.0003	<0.0003	<0.0003	<0.0003
BORON	0.34	0.32	0.24	0.5
CADMIUM	<0.003	<0.003	<0.003	<0.003
CALCIUM	42	30	41	43
CHROMIUM	<0.01	<0.01	<0.01	0.048
COBALT	<0.005	<0.005	<0.005	<0.005
COPPER	0.0076	<0.004	<0.004	0.029
IRON	0.019	0.0098	0.1	0.12
LITHIUM	0.14	0.14	0.14	0.16
MAGNESIUM	15	14	16	16
MANGANESE	0.088	0.052	0.071	0.1
MOLYBDENUM	<0.01	<0.01	<0.01	0.019
NICKEL	<0.01	<0.01	<0.01	0.011
NIOBIUM	<0.007	<0.007	<0.007	0.01
PHOSPHOROUS	<0.2	<0.2	<0.2	0.31
POTASSIUM	24	19	25	6.2
SILICON	4.7	5.5	5.1	5.6
SILVER	<0.006	<0.006	0.0064	0.016
SODIUM	170	170	120	200
STRONTIUM	0.89	0.87	0.78	1.1
THORIUM	<0.2	<0.2	<0.2	<0.2
TITANIUM	<0.003	<0.003	0.02	<0.003
VANADIUM	<0.005	<0.005	<0.005	<0.005
ZINC	0.0011	0.0019	0.0037	<0.001
ZIRCONIUM	<0.005	<0.005	<0.005	0.019
METHOD	AAS	AAS	AAS	AAS
ARSENIC	<0.005	<0.005	<0.005	<0.005
LEAD	<0.004	<0.004	0.011	0.006
SELENIUM	<0.005	<0.005	<0.005	<0.005
THALLIUM	<0.01	<0.01	<0.01	<0.01
MERCURY	<0.0002	<0.0002	<0.0002	<0.0002
ALPHA ACTIVITY (PCI/L)	.	.	.	.
BETA ACTIVITY (PCI/L)	.	.	.	.
URANIUM	0.004	0.002	<0.001	0.004
RADIUM (BQ/L)	.	.	.	.

RESULTS OF 1986 K25 GROUNDWATER SAMPLING
ROGER'S QUARRY

MISCELLANEOUS CONVENTIONAL AND NON-CONVENTIONAL POLLUTANTS AND RELATED PARAMET
UNIT IS MG/L - UNLESS OTHERWISE STATED

WELL	GW-189	GW-189	GW-189	GW-189
DATE SAMPLED	03/04/86	05/01/86	07/15/86	10/21/86
TIME SAMPLED	15:25:00	14:00:00	12:30:00	.
WATER LEVEL (FT +/- GRADE)	-10.5	-11.5	-11.5	-12
WATER TEMP (DEG. CENT.)	11.9	17	19.6	21.3
DISSOLVED OXYGEN	16	6.2	5.4	4.2
CONDUCTIVITY (IN UMHOS/CM)	1010	900	840	990
PH (IN PH UNITS)	9	7.9	8.3	8.1
REDOX (IN MV)	-127	-92	-118	-200
ALKALINITY (CO3)	.	.	.	.
ALKALINITY (HCO3)	.	.	.	.
TOTAL SUSPENDED SOLIDS	.	.	.	.
TOTAL KJELDAHL NITROGEN	.	.	.	.
AMMONIA - N	.	.	.	.
TURBIDITY (IN NTU)	22	1	30	8
COLIFORM (CC/100 MLS)	N	N	N	N
FLUORIDE	0.719	0.8	0.5	1.2
PHENOLS	0.002	0.002	<0.001	0.007
CHLORIDE	39	46	25	83
NITRATE NITROGEN	0.13	<0.11	<0.11	0.18
NITRATE	.	.	.	.
NITRITE	.	.	.	.
SULFATE	63	59	58	40

RESULTS OF 1986 K25 GROUNDWATER SAMPLING
ROGER'S QUARRY

HERBICIDES AND PESTICIDES
UNIT IS UG/L

WELL	GW-189	GW-189	GW-189	GW-189
DATE SAMPLED	03/04/86	05/01/86	07/15/86	10/21/86
TIME SAMPLED	15:25:00	14:00:00	12:30:00	.
2,4-D	<1	<2	<2	<1
ENDRIN	<0.05	<0.1	<0.1	<0.05
LINDANE	<0.01	<0.02	<0.02	<0.01
METHOXYCHLOR	<0.04	<0.08	<0.08	<0.04
SILVEX	<0.1	<0.2	<0.2	<0.1
TOXAPHENE	<1	<2	<2	<1

RESULTS OF 1986 K25 GROUNDWATER SAMPLING
ROGER'S QUARRY

LAB REPLICATES
UNIT IS UG/L FOR TOX - MG/L FOR TOC

WELL	GW-189	GW-189	GW-189	GW-189
DATE SAMPLED	03/04/86	05/01/86	07/15/86	10/21/86
TIME SAMPLED	15:25:00	14:00:00	12:30:00	.
CONDUCTIVITY (IN UMHOS/CM)	986	902	870	1030
	1063	927	873	1030
	1079	926	872	1070
	1082	915	873	1060
PH (IN PH UNITS)	8.3	7.8	7.6	7.8
	8.3	7.6	7.6	7.8
	8.3	7.6	7.7	7.9
	8.3	7.6	7.7	7.8
TOTAL ORGANIC CARBON	115	123	116	147
	110	119	112	155
	120	122	113	158
	110	121	117	161
TOTAL ORGANIC CHLORIDE	33	100	41	92
	35	42	43	64
	36	379	37	76
	36	103	40	39

RESULTS OF 1986 K25 GROUNDWATER SAMPLING
ROGER'S QUARRY

Table 6

TOTAL METALS-RADIOACTIVITY-RADIUM
UNIT IS MG/L - UNLESS OTHERWISE STATED

WELL	GW-224 TOTAL	GW-224 TOTAL	GW-224 TOTAL	GW-224 TOTAL
DATE SAMPLED	03/10/86	04/29/86	07/15/86	10/20/86
TIME SAMPLED	15:00:00	13:45:00	13:15:00	13:30:00
METHOD	ICAP	ICAP	ICAP	ICAP
ALUMINUM	<0.02	<0.02	<0.02	0.022
ANTIMONY	.	<0.05	<0.05	<0.05
BARIUM	0.12	0.12	0.15	0.15
BERYLLIUM	<0.0003	<0.0003	<0.0003	<0.0003
BORON	0.15	0.2	0.24	0.27
CADMIUM	<0.003	<0.003	<0.003	<0.003
CALCIUM	65	45	49	42
CHROMIUM	<0.01	<0.01	<0.01	<0.01
COBALT	<0.005	<0.005	<0.005	<0.005
COPPER	<0.004	<0.004	<0.004	<0.004
IRON	0.12	0.049	0.035	0.047
LITHIUM	0.028	0.06	0.075	0.076
MAGNESIUM	24	18	21	19
MANGANESE	0.0075	<0.001	<0.001	0.0035
MOLYBDENUM	<0.01	<0.01	<0.01	0.01
NICKEL	<0.01	<0.01	<0.01	<0.01
NIOBIUM	<0.007	<0.007	0.026	<0.007
PHOSPHOROUS	<0.2	<0.2	<0.2	<0.2
POTASSIUM	1.7	1.9	4.3	2.5
SILICON	4.3	4.5	4.6	4.5
SILVER	<0.006	<0.006	<0.006	<0.006
SODIUM	43	73	85	92
STRONTIUM	1.1	0.97	1	0.99
THORIUM	<0.2	<0.2	<0.2	<0.2
TITANIUM	<0.003	<0.003	<0.003	<0.003
VANADIUM	<0.005	<0.005	<0.005	<0.005
ZINC	0.01	0.0077	0.0074	0.014
ZIRCONIUM	<0.005	<0.005	0.0052	0.011
METHOD	AAS	AAS	AAS	AAS
ARSENIC	0.007	<0.005	<0.005	<0.005
LEAD	<0.004	<0.004	0.007	0.006
SELENIUM	<0.005	<0.005	<0.005	<0.005
THALLIUM	<0.01	<0.01	<0.01	<0.01
MERCURY	<0.0002	<0.0002	<0.0002	<0.0002
ALPHA ACTIVITY (PCI/L)	1	<1	<1	<2
BETA ACTIVITY (PCI/L)	5	2.39	5	<2
URANIUM	<0.001	1.0E-03	<0.001	0.003
RADIUM (BQ/L)	<0.1	<0.1	<0.1	<0.1

RESULTS OF 1986 K25 GROUNDWATER SAMPLING
ROGER'S QUARRY

DISSOLVED METALS-RADIOACTIVITY-RADIUM
UNIT IS MG/L - UNLESS OTHERWISE STATED

WELL	GW-224 DISSOLVED	GW-224 DISSOLVED	GW-224 DISSOLVED	GW-224 DISSOLVED
DATE SAMPLED	03/10/86	04/29/86	07/15/86	10/20/86
TIME SAMPLED	15:00:00	13:45:00	13:15:00	13:30:00
METHOD	ICAP	ICAP	ICAP	ICAP
ALUMINUM	<0.02	<0.02	<0.02	0.029
ANTIMONY	.	<0.05	<0.05	<0.05
BARIUM	0.12	0.12	0.1	0.14
BERYLLIUM	<0.0003	<0.0003	<0.0003	<0.0003
BORON	0.15	0.2	0.22	0.26
CADMIUM	<0.003	<0.003	<0.003	<0.003
CALCIUM	63	45	15	42
CHROMIUM	<0.01	<0.01	<0.01	<0.01
COBALT	<0.005	<0.005	<0.005	<0.005
COPPER	<0.004	<0.004	<0.004	<0.004
IRON	0.015	0.018	<0.004	0.27
LITHIUM	0.028	0.061	0.07	0.074
MAGNESIUM	23	18	19	19
MANGANESE	0.0068	<0.001	<0.001	0.0048
MOLYBDENUM	<0.01	<0.01	<0.01	<0.01
NICKEL	<0.01	<0.01	<0.01	0.01
NIOBIUM	<0.007	<0.007	<0.007	<0.007
PHOSPHOROUS	<0.2	<0.2	<0.2	<0.2
POTASSIUM	2.1	2.1	3.9	2.7
SILICON	4.4	4.3	4.5	4.4
SILVER	<0.006	<0.006	<0.006	<0.006
SODIUM	43	73	81	90
STRONTIUM	1.1	0.99	0.8	0.97
THORIUM	<0.2	<0.2	<0.2	<0.2
TITANIUM	<0.003	<0.003	0.014	<0.003
VANADIUM	<0.005	<0.005	<0.005	<0.005
ZINC	0.0012	0.0063	0.0024	<0.001
ZIRCONIUM	<0.005	<0.005	<0.005	<0.005
METHOD	AAS	AAS	AAS	AAS
ARSENIC	<0.005	<0.005	<0.005	<0.005
LEAD	<0.004	<0.004	0.005	0.005
SELENIUM	<0.005	<0.005	<0.005	<0.005
THALLIUM	<0.01	<0.01	<0.01	<0.01
MERCURY	<0.0002	<0.0002	<0.0002	<0.0002
ALPHA ACTIVITY (PCI/L)	.	.	.	.
BETA ACTIVITY (PCI/L)	.	.	.	.
URANIUM	<0.001	<0.001	1.0E-03	0.003
RADIUM (BQ/L)	.	.	.	.

RESULTS OF 1986 K25 GROUNDWATER SAMPLING
ROGER'S QUARRY

MISCELLANEOUS CONVENTIONAL AND NON-CONVENTIONAL POLLUTANTS AND RELATED PARAMETE
UNIT IS MG/L - UNLESS OTHERWISE STATED

WELL	GW-224	GW-224	GW-224	GW-224
DATE SAMPLED	03/10/86	04/29/86	07/15/86	10/20/86
TIME SAMPLED	15:00:00	13:45:00	13:15:00	13:30:00
WATER LEVEL (FT +/- GRADE)	-15	-16.5	-16	-16
WATER TEMP (DEG. CENT.)	18.1	25.4	18.4	16
DISSOLVED OXYGEN	2.6	4	4.1	6
CONDUCTIVITY (IN UMHOS/CM)	560	610	590	640
PH (IN PH UNITS)	7.8	7.97	7.4	7
REDOX (IN MV)	-145	-142	-238	-233
ALKALINITY (CO3)	.	.	.	.
ALKALINITY (HCO3)	.	.	.	.
TOTAL SUSPENDED SOLIDS	.	.	.	.
TOTAL KJELDAHL NITROGEN	.	.	.	.
AMMONIA - N	.	.	.	.
TURBIDITY (IN NTU)	<1	<1	3	<1
COLIFORM (CC/100 MLS)	N	N	N	10
FLUORIDE	0.273	0.5	0.4	0.2
PHENOLS	<0.001	0.002	<0.001	0.003
CHLORIDE	10.7	21.8	20	21
NITRATE NITROGEN	<0.11	<0.11	<0.11	<0.11
NITRATE	.	.	.	.
NITRITE	.	.	.	.
SULFATE	58	49	48	43

RESULTS OF 1986 K25 GROUNDWATER SAMPLING
ROGER'S QUARRY

HERBICIDES AND PESTICIDES
UNIT IS UG/L

WELL	GW-224	GW-224	GW-224	GW-224
DATE SAMPLED	03/10/86	04/29/86	07/15/86	10/20/86
TIME SAMPLED	15:00:00	13:45:00	13:15:00	13:30:00
2,4-D	<2	<2	<2	<1
ENDRIN	<0.05	<0.1	<0.1	<0.05
LINDANE	<0.01	<0.02	<0.02	<0.01
METHOXYCHLOR	<0.04	<0.08	<0.08	<0.04
SILVEX	<0.2	<0.2	<0.2	<0.1
TOXAPHENE	<1	<2	<2	<1

RESULTS OF 1986 K25 GROUNDWATER SAMPLING
ROGER'S QUARRY

LAB REPLICATES
UNIT IS UG/L FOR TOX - MG/L FOR TOC

WELL	GW-224	GW-224	GW-224	GW-224
DATE SAMPLED	03/10/86	04/29/86	07/15/86	10/20/86
TIME SAMPLED	15:00:00	13:45:00	13:15:00	13:30:00
CONDUCTIVITY (IN UMHOS/CM)	536	678	681	729
	561	680	679	730
	566	681	684	728
	565	682	685	728
PH (IN PH UNITS)	7.8	7.7	7.7	7.8
	7.9	7.6	7.6	7.8
	7.8	7.6	7.7	7.8
	7.9	7.6	7.7	7.8
TOTAL ORGANIC CARBON	85	89	84	95
	87	88	80	98
	84	89	83	93
	85	88	75	49
TOTAL ORGANIC CHLORIDE	54	19	167	46
	<5	<5	181	165
	5	<5	188	93
	14	16	171	53

APPENDIX 2

WATER QUALITY GRAPHS BY CONSTITUENT
CY 1986

FIGURE 12

ROGER'S QUARRY

1986 GROUNDWATER DATA
TOTAL ARSENIC (MG/L)

APPROXIMATION TO LOG PLOT
UPGRADIENT: GW-164 DEEP: GW-167, GW-169 AND GW-224
DOWNGRADIENT: ALL OTHER WELLS
MAX. CONC. LIMIT: 0.05 MG/L - MAX. DETECTION LIMIT: 0.005 MG/L

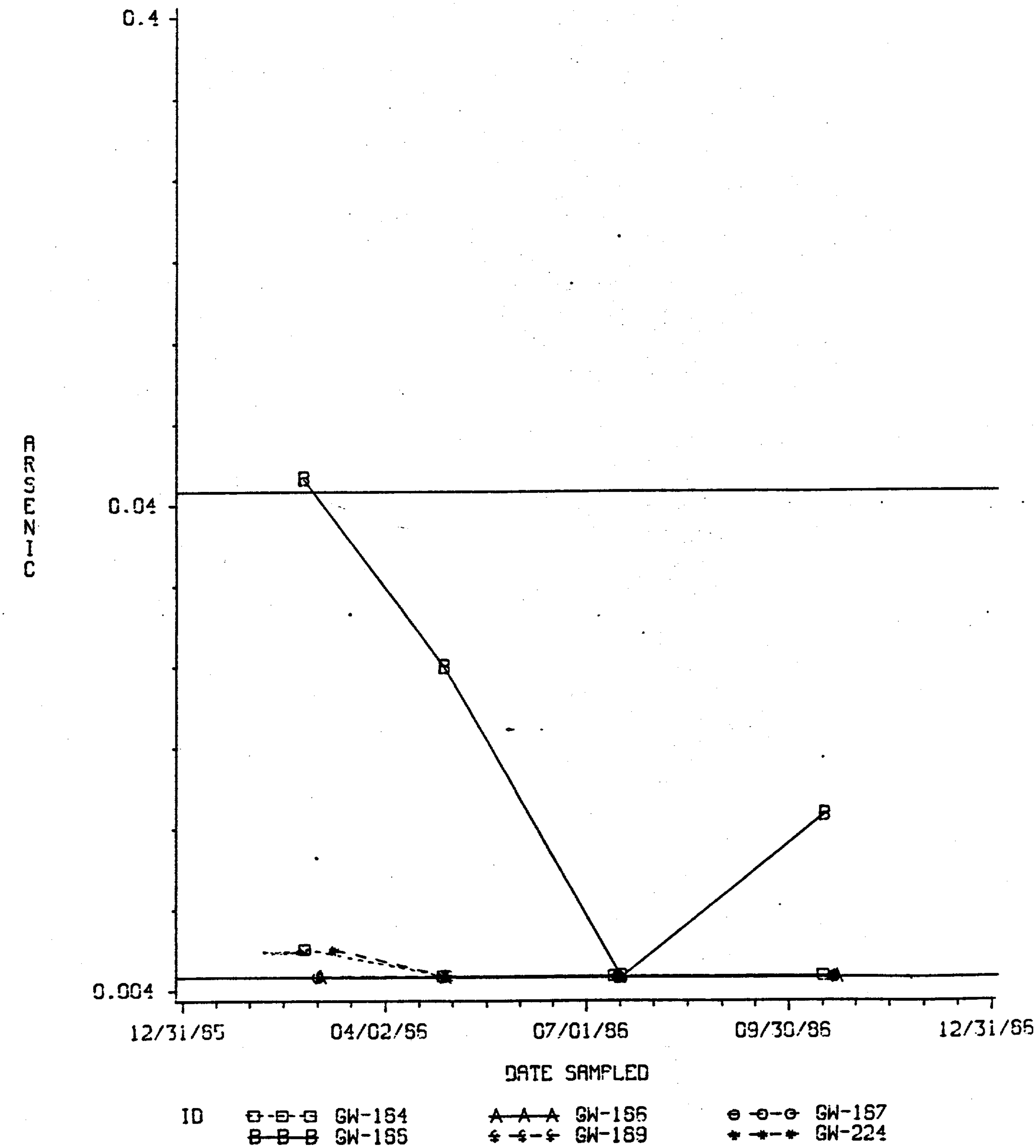


FIGURE 13

ROGER'S QUARRY

1986 GROUNDWATER DATA
TOTAL BARIUM (MG/L)

APPROXIMATION TO LOG PLOT
UPGRADIENT: GW-184 DEEP: GW-187, GW-189 AND GW-224
DOWNGRADIENT: ALL OTHER WELLS
MAX. CONC. LIMIT: 1 MG/L

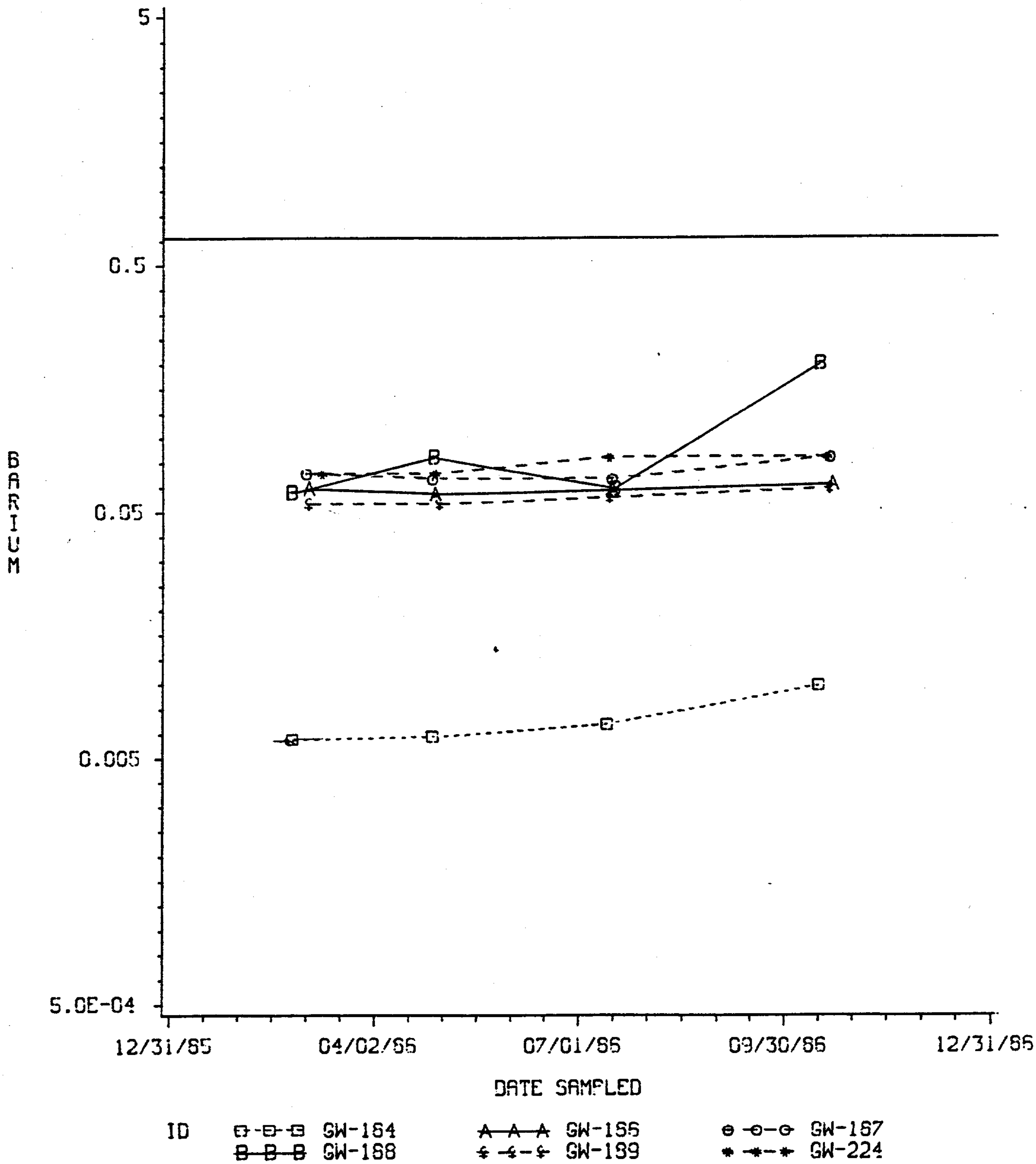


FIGURE 14

ROGER'S QUARRY

1986 GROUNDWATER DATA
TOTAL CADMIUM (MG/L)

APPROXIMATION TO LOG PLOT
UPGRADIENT: GW-184 DEEP: GW-187, GW-189 AND GW-224
DOWNGRADIENT: ALL OTHER WELLS
MAX. CONC. LIMIT: 0.01 MG/L - MAX. DETECTION LIMIT: 0.003 MG/L

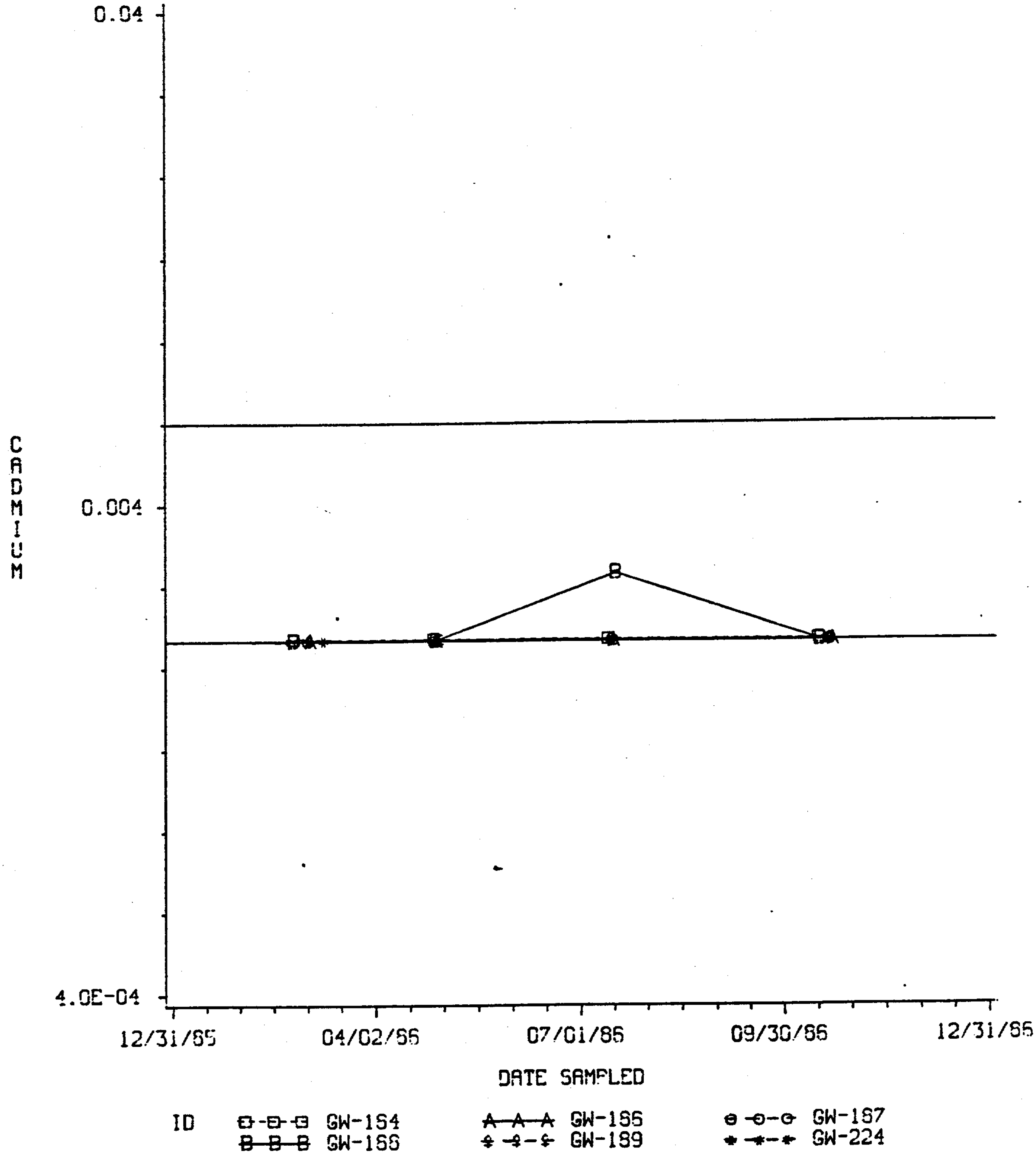


FIGURE 15

ROGER'S QUARRY

1986 GROUNDWATER DATA
TOTAL CHROMIUM (MG/L)

APPROXIMATION TO LOG PLOT
UPGRADIENT: GW-184 DEEP: GW-187, GW-189 AND GW-224
DOWNGRADIENT: ALL OTHER WELLS
MAX. CONC. LIMIT: 0.05 MG/L - MAX. DETECTION LIMIT: 0.01 MG/L

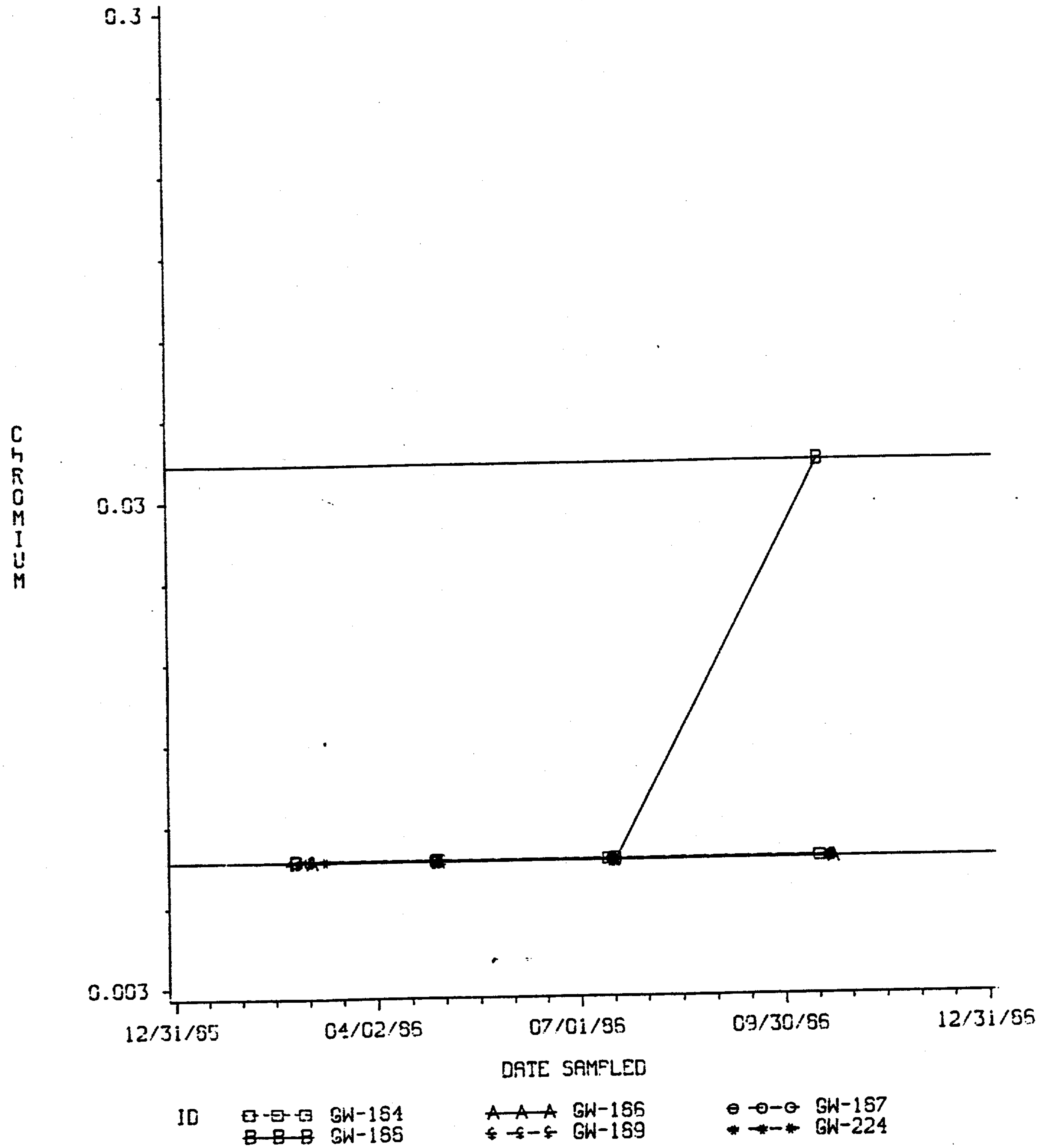


FIGURE 16

ROGER'S QUARRY

1986 GROUNDWATER DATA
TOTAL LEAD (MG/L)

APPROXIMATION TO LOG PLOT
UPGRADIENT: GW-184 DEEP: GW-187, GW-189 AND GW-224
DOWNGRADIENT: ALL OTHER WELLS
MAX. CONC. LIMIT: 0.05 MG/L - MAX. DETECTION LIMIT: 0.005 MG/L

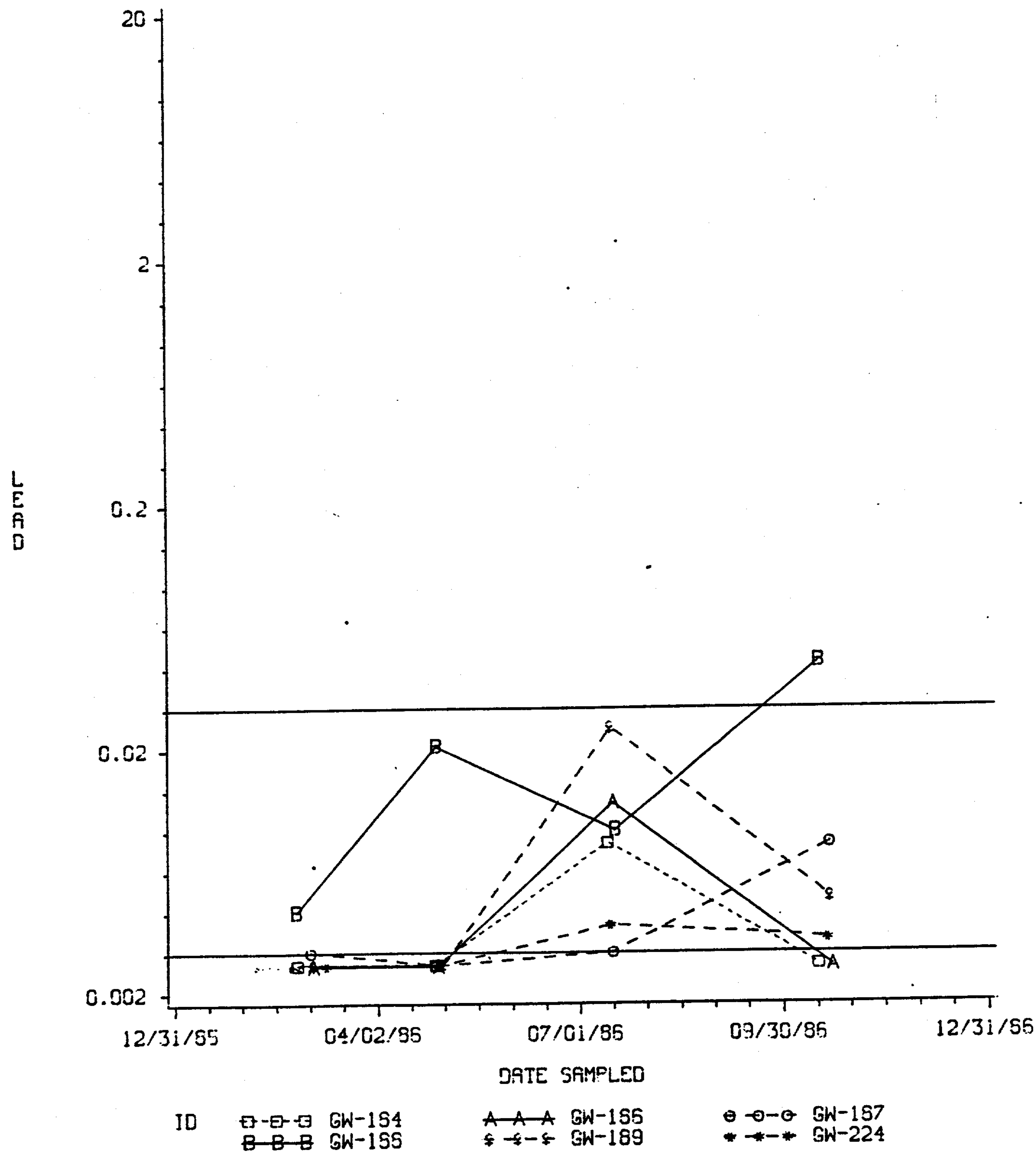


FIGURE 17

ROGER'S QUARRY

1986 GROUNDWATER DATA
TOTAL MERCURY (MG/L)

APPROXIMATION TO LOG PLOT
UPGRADIENT: GW-184 DEEP: GW-187, GW-189 AND GW-224
DOWNGRADIENT: ALL OTHER WELLS
MAX. CONC. LIMIT: 0.002 MG/L - MAX. DETECTION LIMIT: 0.0002 MG/L

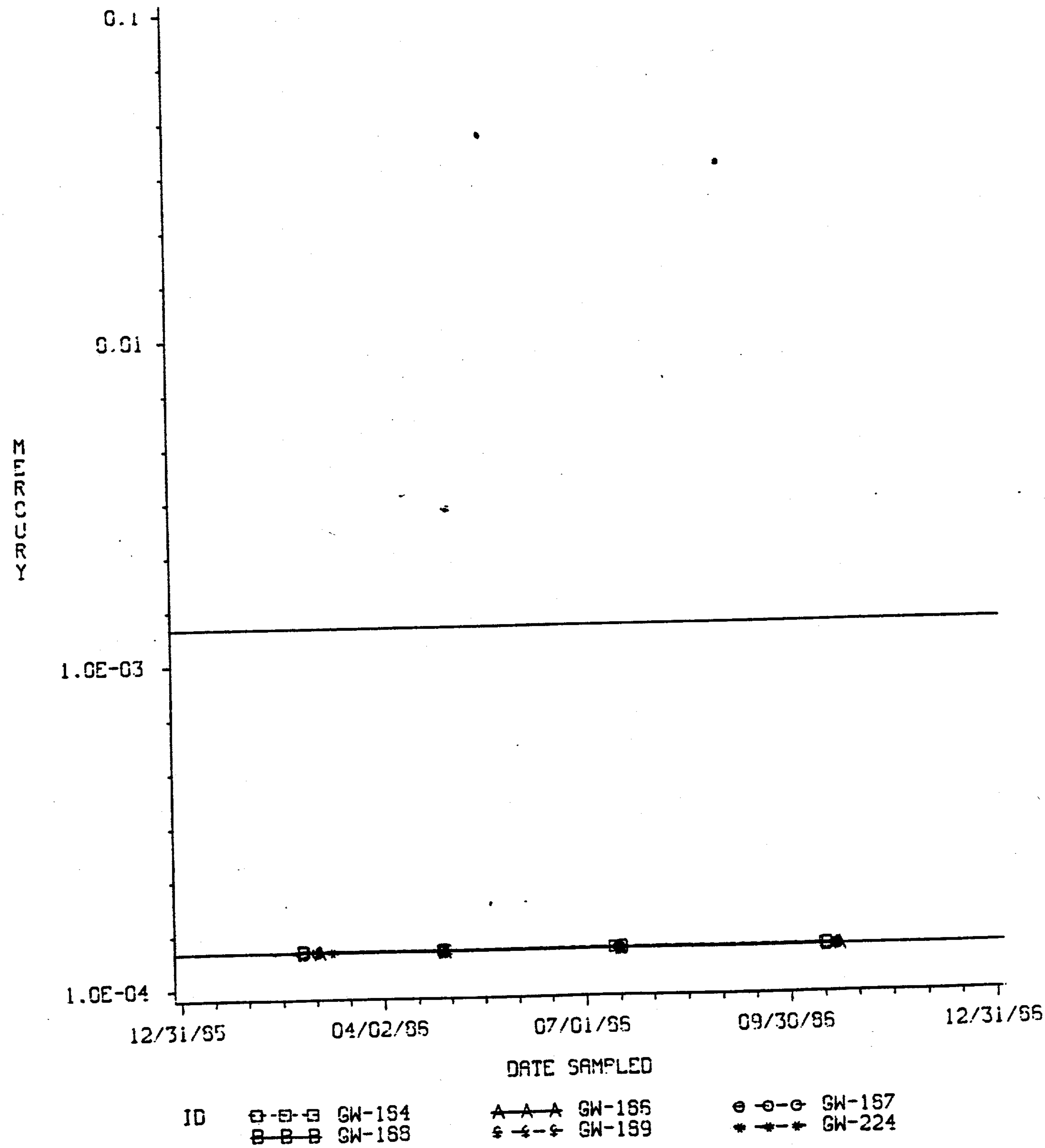


FIGURE 18

ROGER'S QUARRY

1986 GROUNDWATER DATA
TOTAL SELENIUM (MG/L)

UPGRADIENT: GW-184 DEEP: GW-187, GW-189 AND GW-224
DOWNGRADIENT: ALL OTHER WELLS
MAX. CONC. LIMIT: 0.01 MG/L - MAX. DETECTION LIMIT: 0.005 MG/L

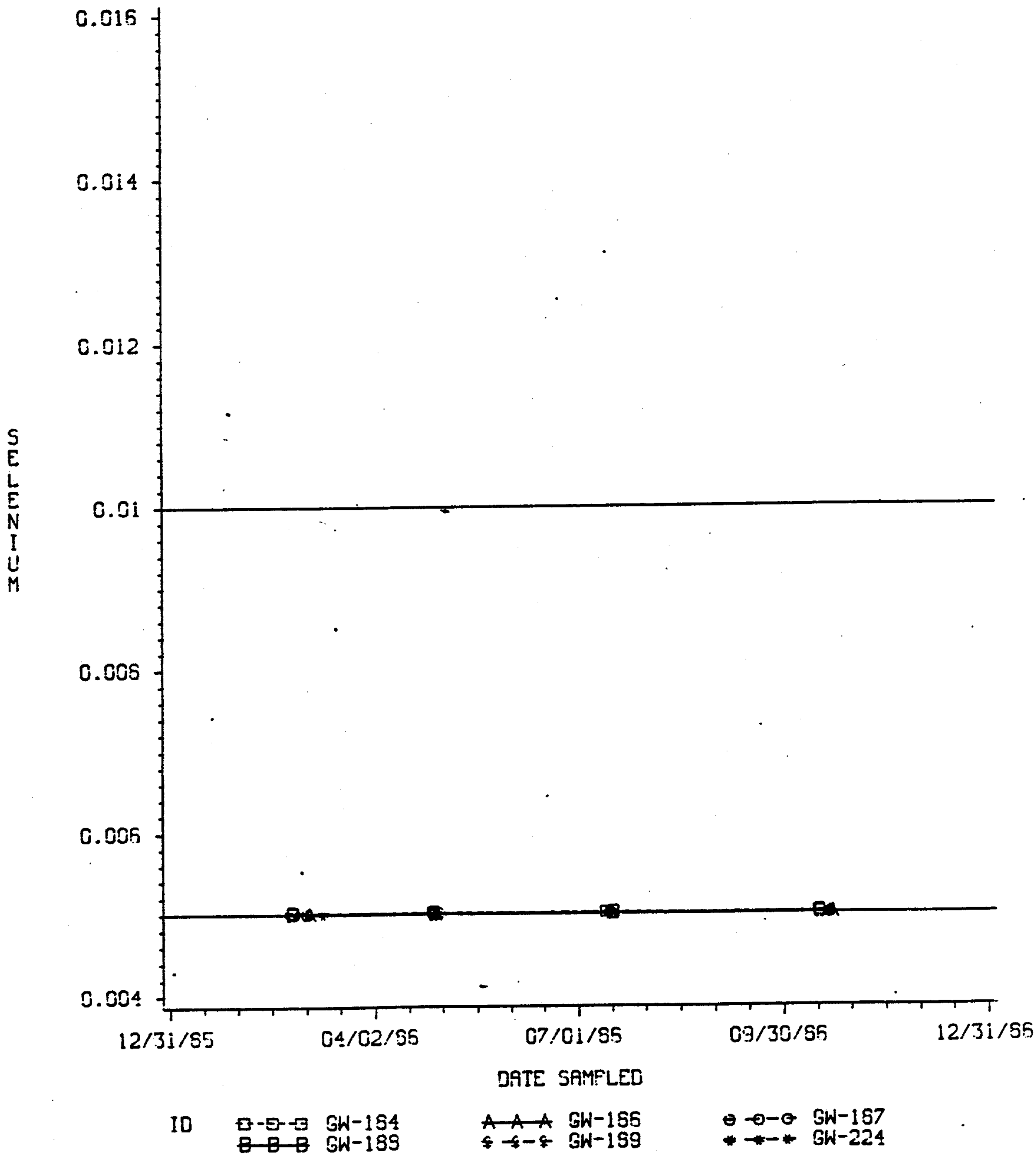


FIGURE 19

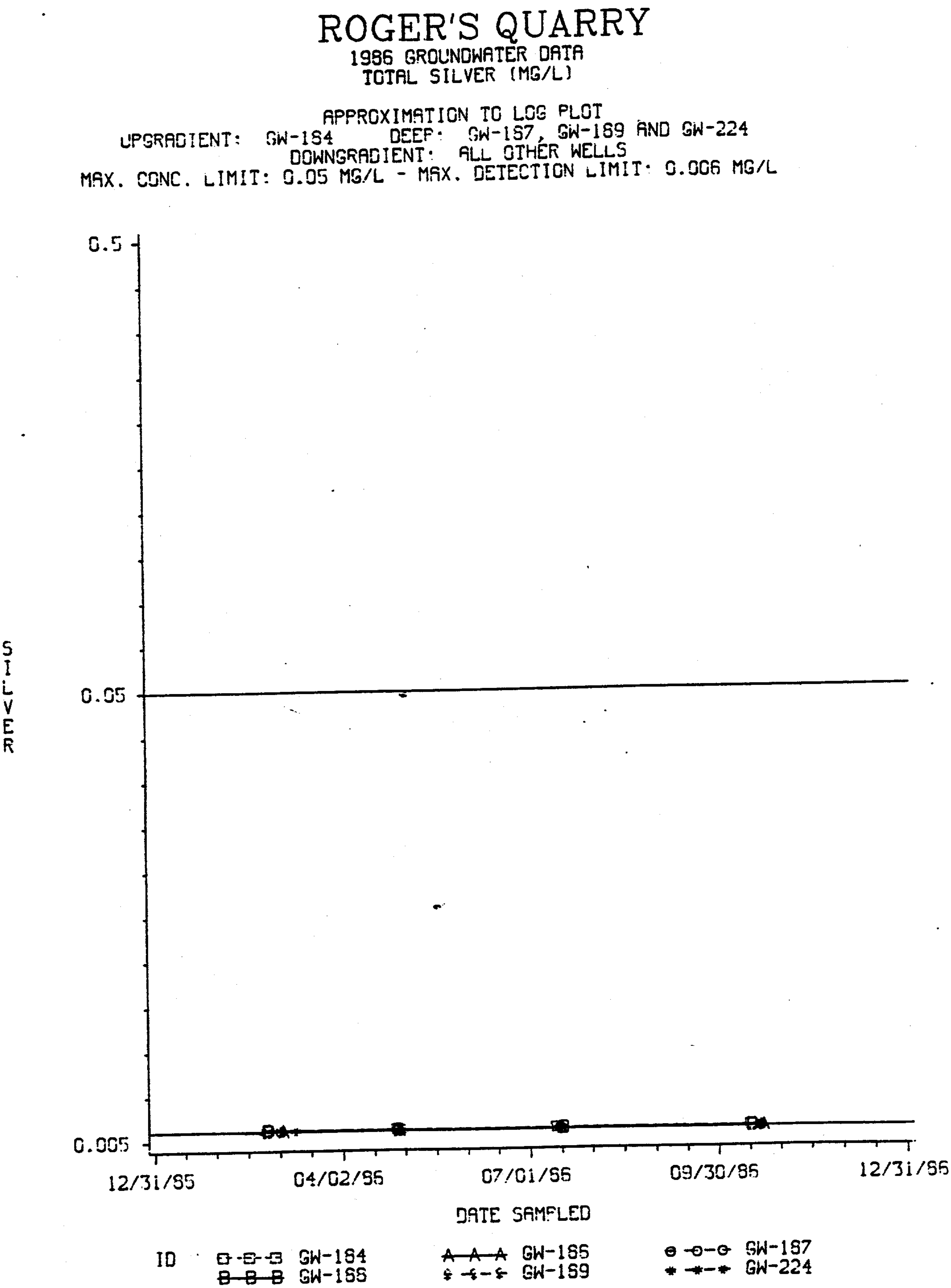

ROGER'S QUARRY
1986 GROUNDWATER DATA
TOTAL SILVER (MG/L)
APPROXIMATION TO LOG PLOT
UPGRADIENT: GW-184 DEEP: GW-187, GW-189 AND GW-224
DOWNGRADIENT: ALL OTHER WELLS
MAX. CONC. LIMIT: 0.05 MG/L - MAX. DETECTION LIMIT: 0.006 MG/L
0.5
0.05
0.005
SILVER
12/31/85
04/02/86
07/01/86
09/30/86
12/31/86
DATE SAMPLED
ID
GW-184
GW-186
GW-185
GW-189
GW-187
GW-224

FIGURE 20

ROGER'S QUARRY

1986 GROUNDWATER DATA
FLUORIDE (MG/L)

APPROXIMATION TO LOG PLOT
UPGRADIENT: GW-184 DEEP: GW-187, GW-189 AND GW-224
DOWNGRADIENT: ALL OTHER WELLS
MAX. CONC. LIMIT: 1.9 MG/L - MAX. DETECTION LIMIT: 0.11 MG/L

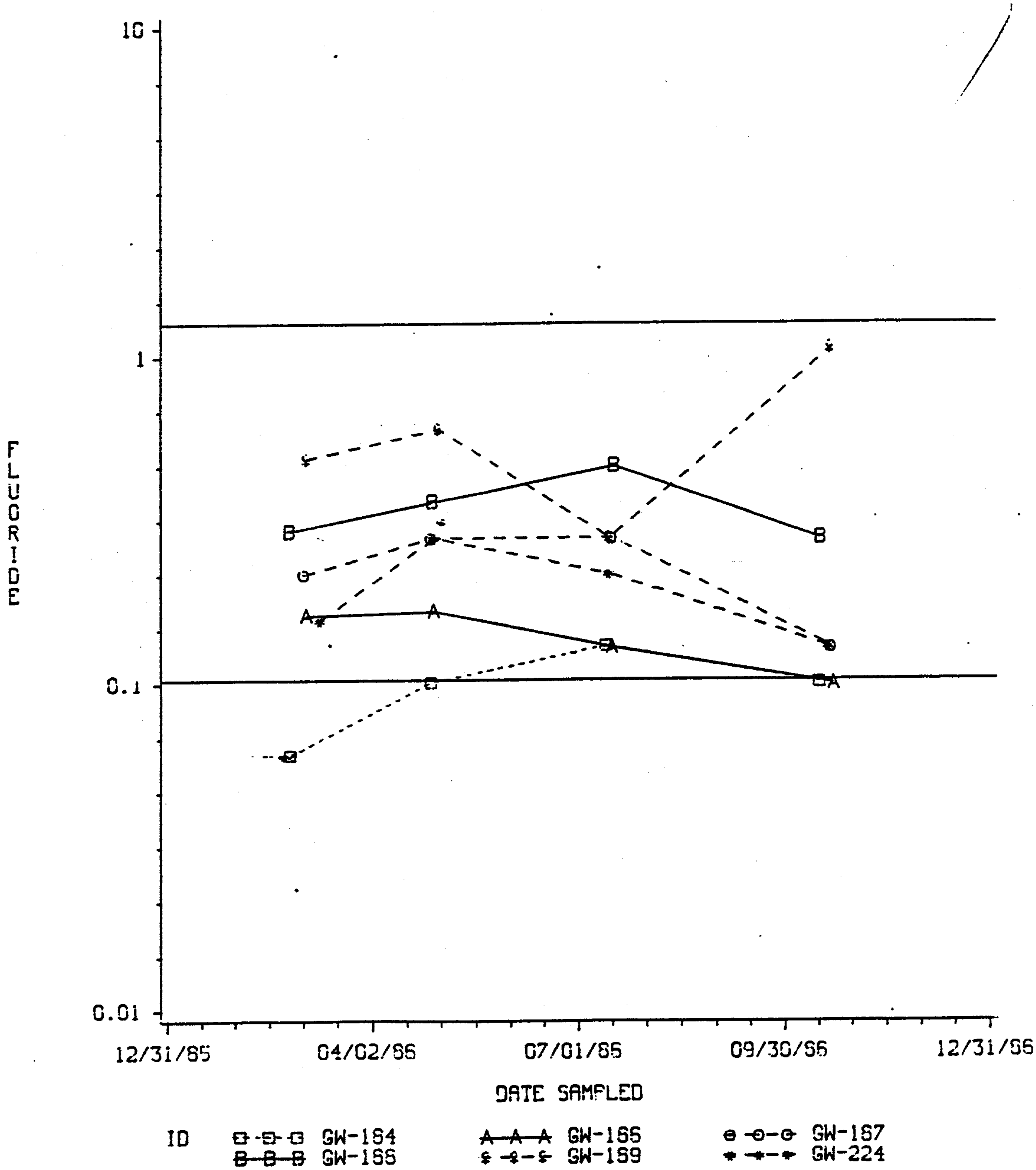
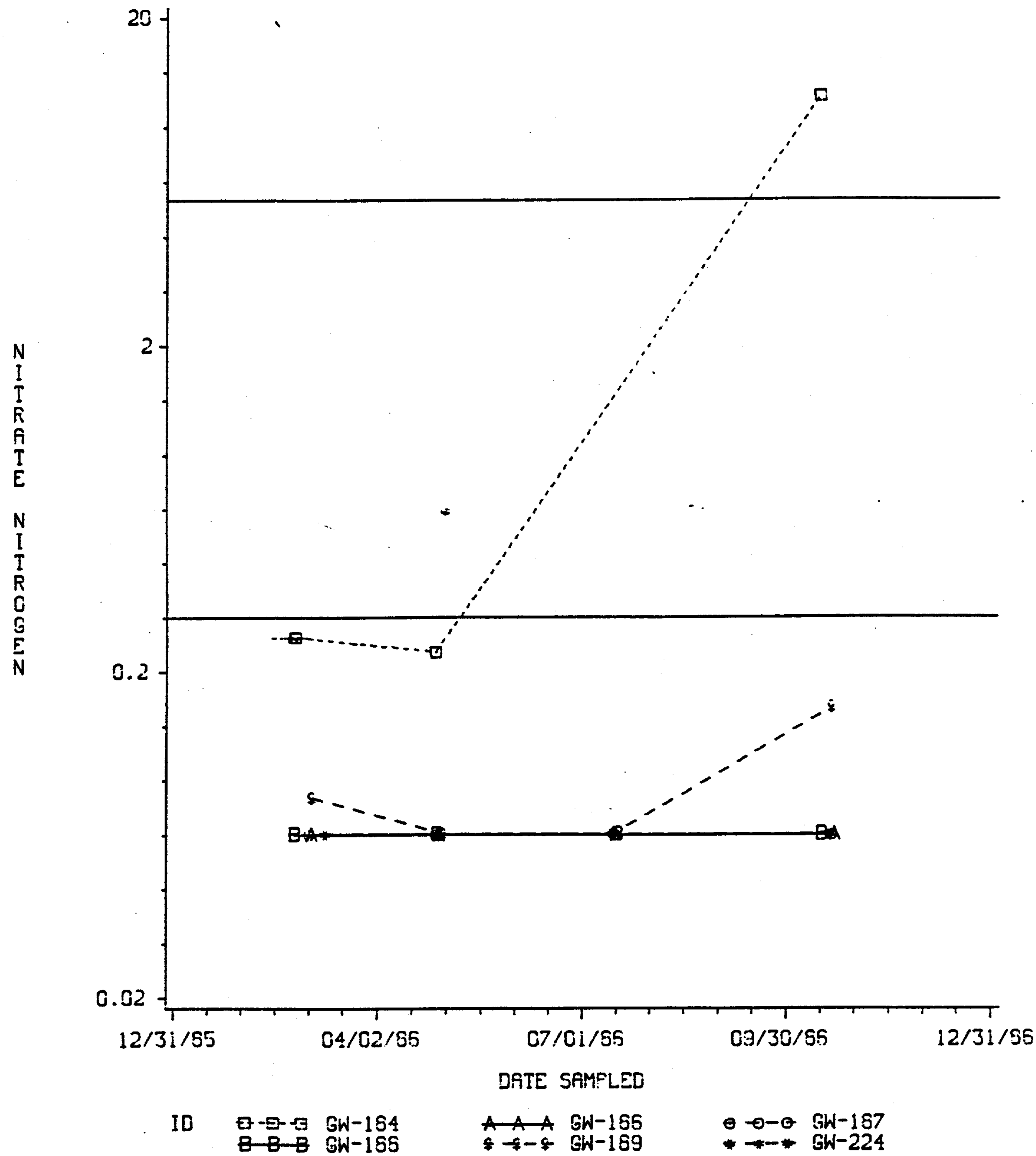


FIGURE 21

ROGER'S QUARRY

1966 GROUNDWATER DATA
NITRATE-N (MG/L)

APPROXIMATION TO LOG PLOT
UPGRADIENT: GW-184 DEEP: GW-187, GW-189 AND GW-224
DOWNGRADIENT: ALL OTHER WELLS
MAX. CONC. LIMIT: 10 MG/L - MAX. DETECTION LIMIT: 0.5 MG/L



ROGER'S QUARRY

1986 GROUNDWATER DATA
GROSS ALPHA (PCI/L)

APPROXIMATION TO LOG PLOT
UPGRADIENT: GW-184 DEEP: GW-187, GW-189 AND GW-224
DOWNGRADIENT: ALL OTHER WELLS
MAX. CONC. LIMIT: 15 PCI/L - MAX. DETECTION LIMIT: 3 PCI/L

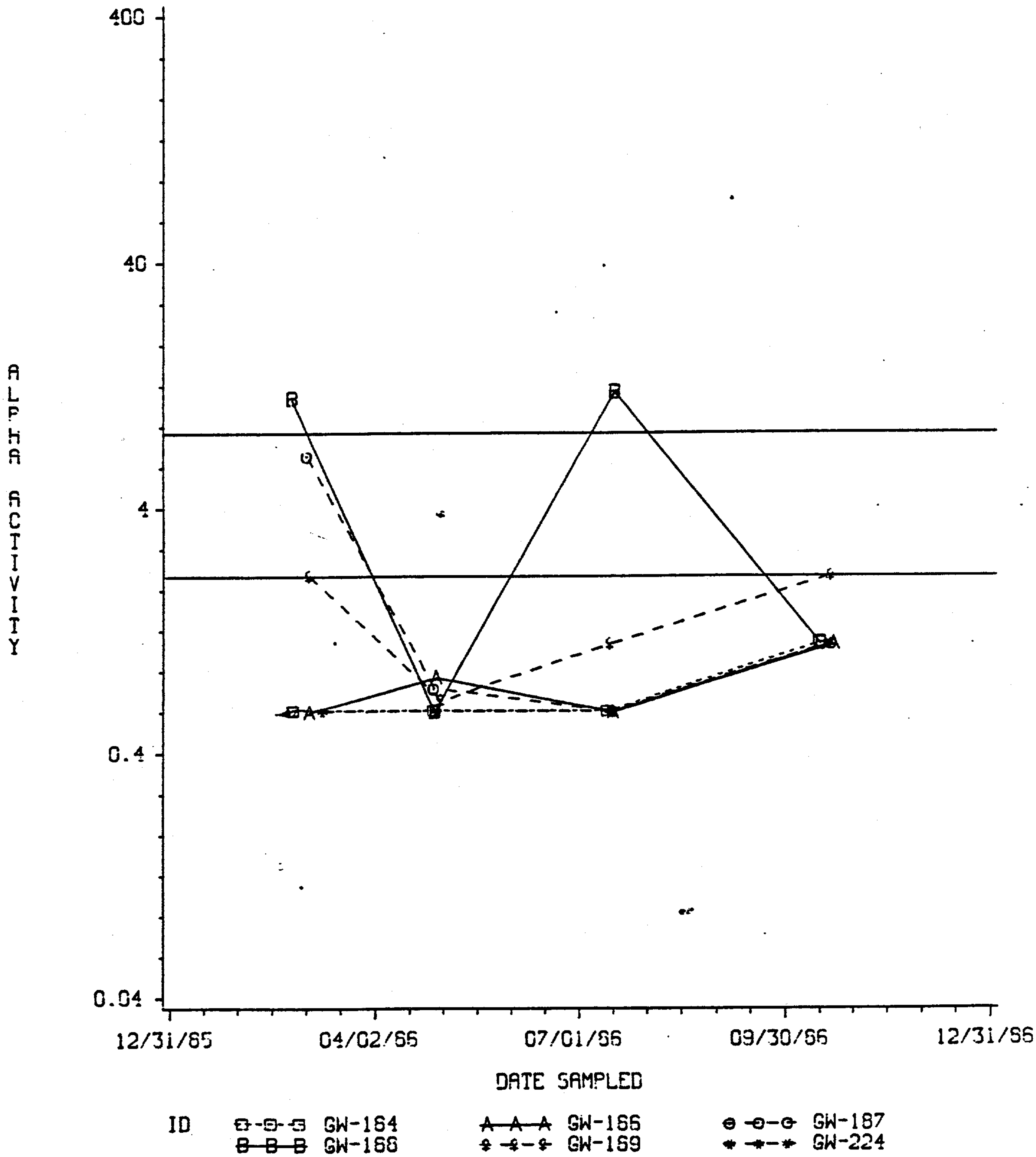


FIGURE 23

ROGER'S QUARRY

1986 GROUNDWATER DATA
GROSS BETA (PCI/L)

APPROXIMATION TO LOG PLOT
UPGRADIENT: GW-184 DEEP: GW-187, GW-189 AND GW-224
DOWNGRADIENT: ALL OTHER WELLS
MAX. CONC. LIMIT: 50 PCI/L - MAX. DETECTION LIMIT: 7 PCI/L

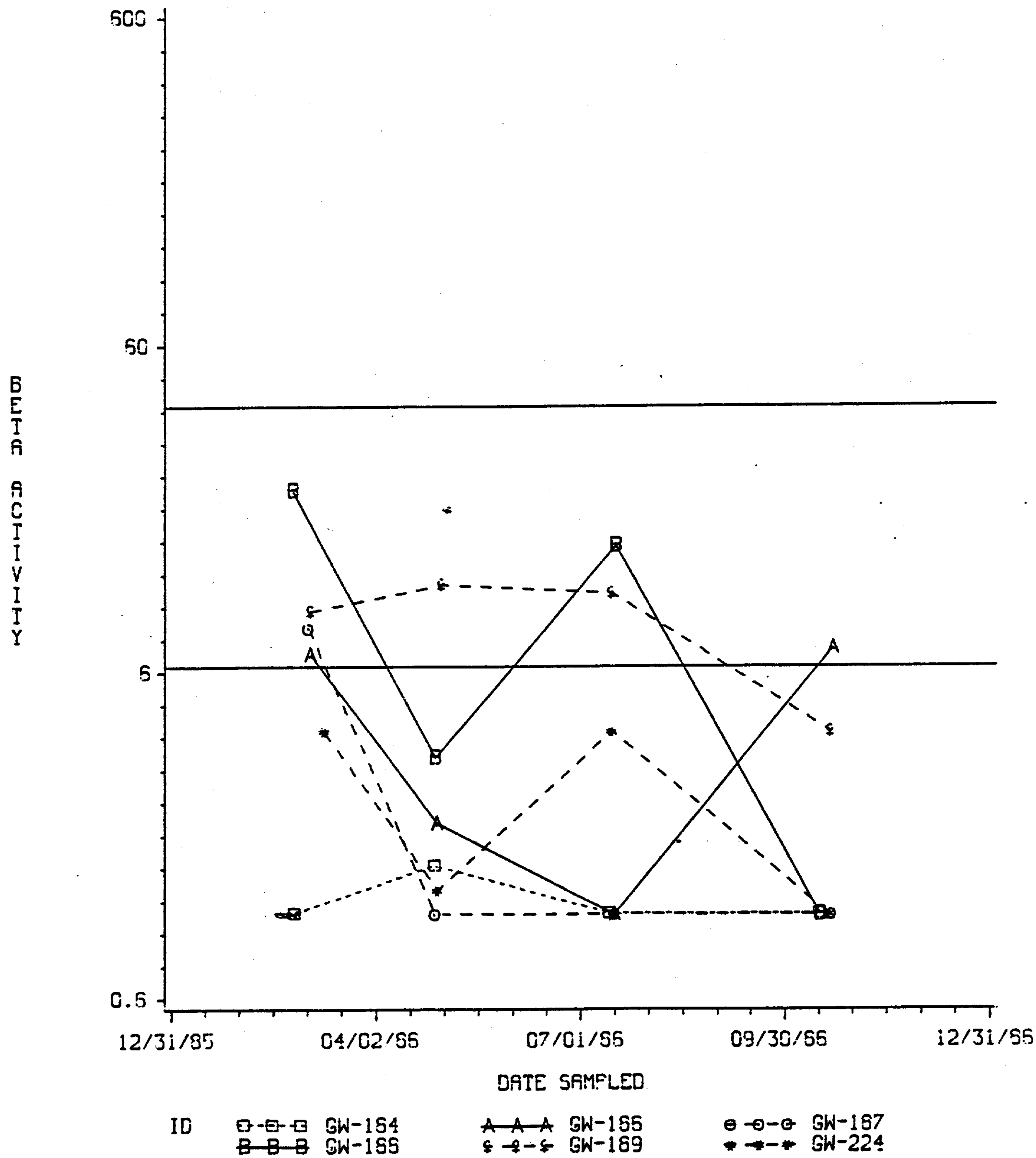


FIGURE 24

ROGER'S QUARRY

1986 GROUNDWATER DATA
RADIUM (BQ/L)

APPROXIMATION TO LOG PLOT
UPGRADIENT: GW-184 DEEP: GW-187, GW-189 AND GW-224
DOWNGRADIENT: ALL OTHER WELLS
MAX. CONC. LIMIT: 0.185 BQ/L - MAX. DETECTION LIMIT: 0.1 BQ/L

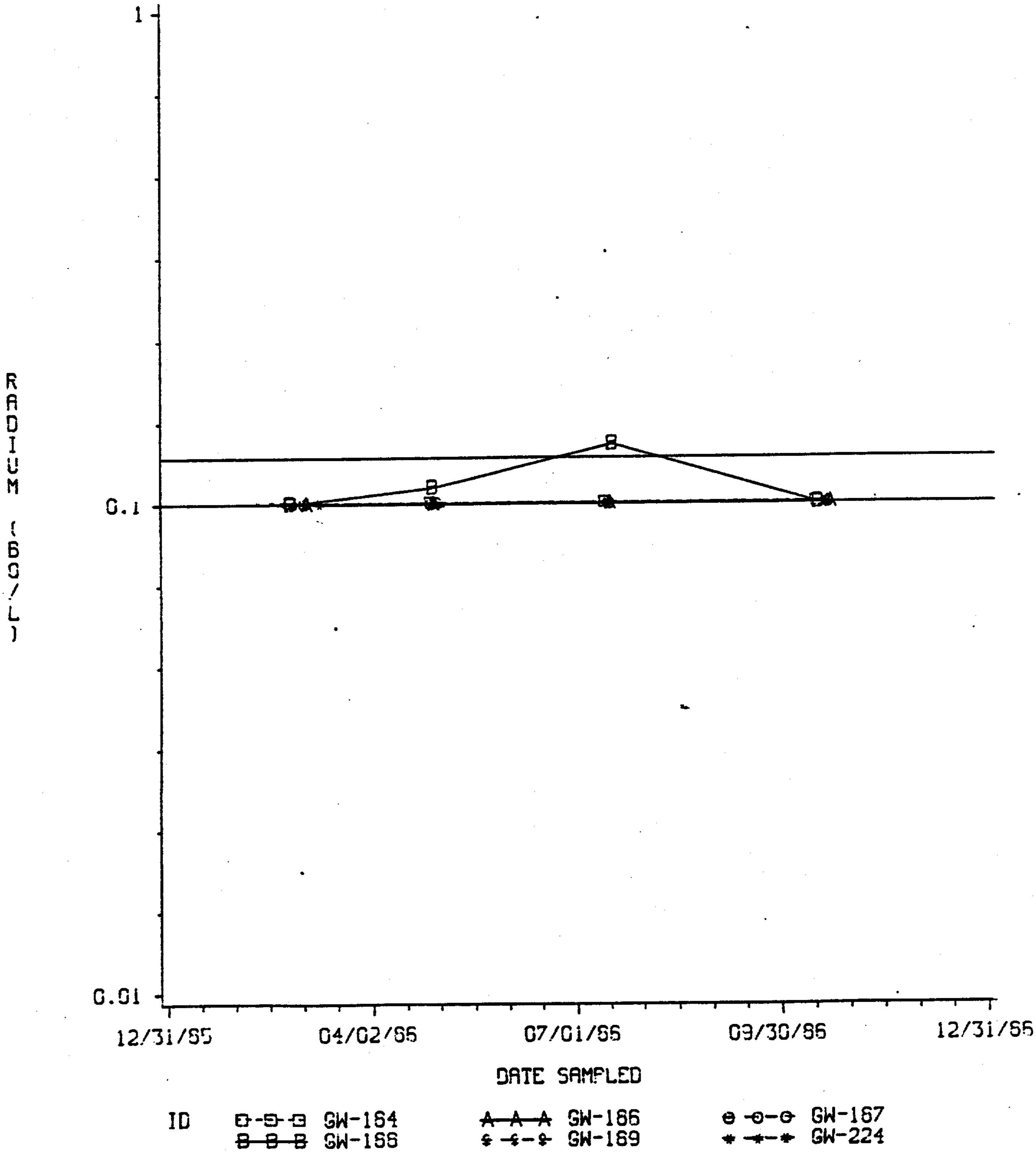


FIGURE 25

ROGER'S QUARRY

1986 GROUNDWATER DATA
COLIFORM (CC/100 ML)

UPGRADIENT: GW-184 DEEP: GW-187, GW-189 AND GW-224
DOWNGRADIENT: ALL OTHER WELLS
MAX. CONC. LIMIT: 1 CC/100 ML

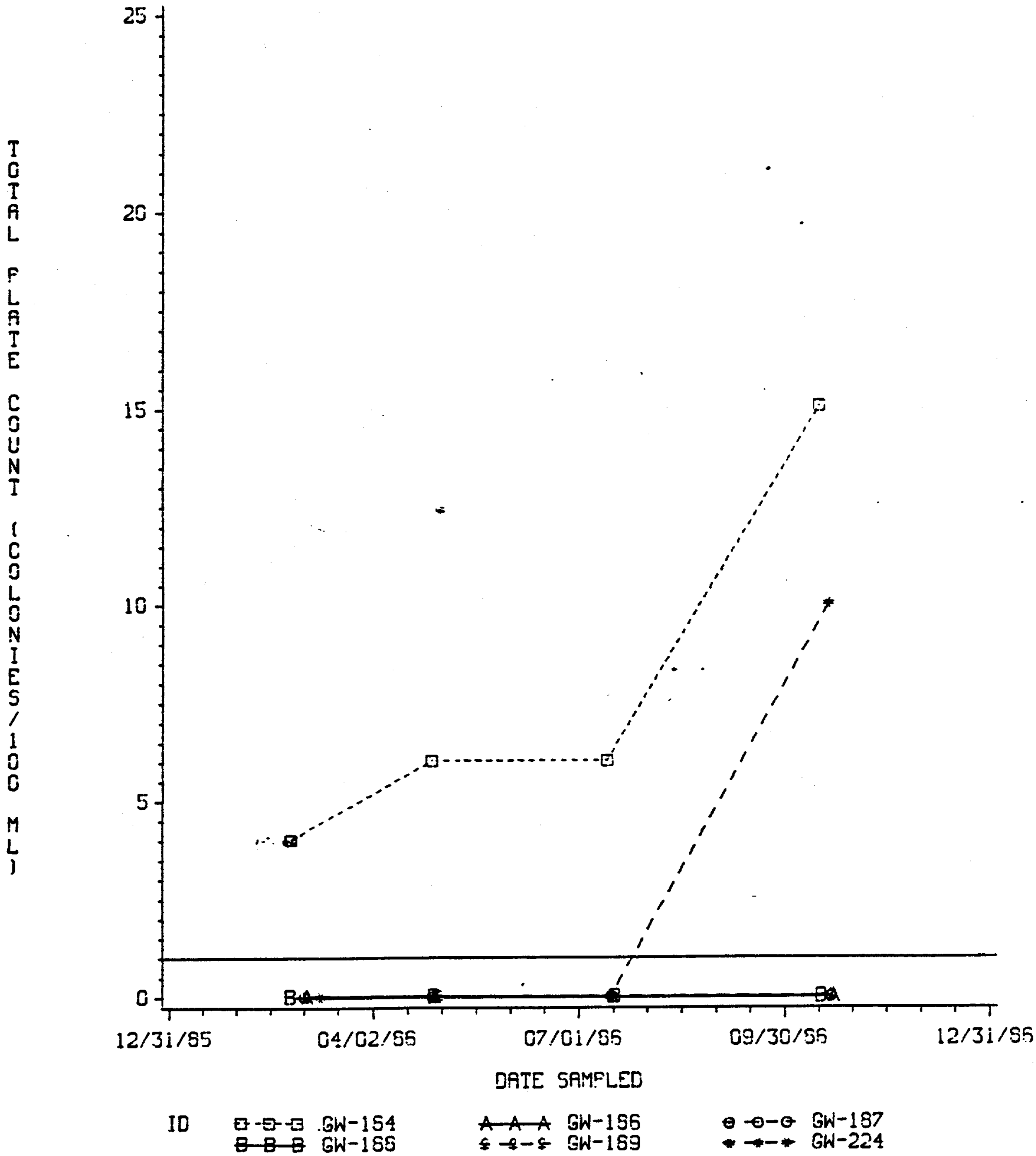


FIGURE 26

ROGER'S QUARRY

1986 GROUNDWATER DATA
CHLORIDE (MG/L)

APPROXIMATION TO LOG PLOT
UPGRADIENT: GW-184 DEEP: GW-187, GW-189 AND GW-224
DOWNGRADIENT: ALL OTHER WELLS
RECOM. MAX. CONC. LIMIT: 250 MG/L - MAX. DETECTION LIMIT: 1 MG/L

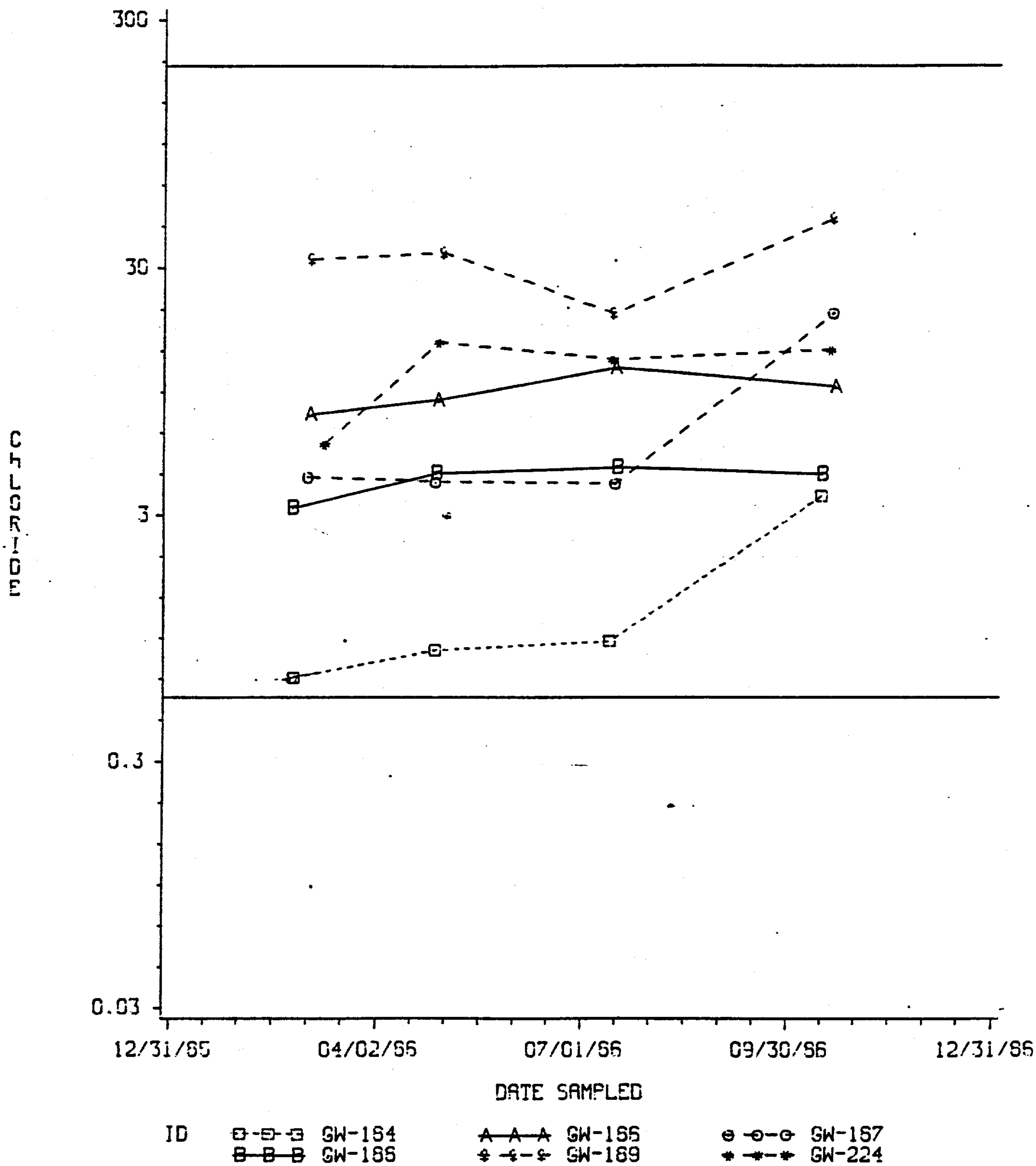


FIGURE 27

ROGER'S QUARRY

1986 GROUNDWATER DATA
TOTAL IRON (MG/L)

APPROXIMATION TO LOG PLOT
UPGRADIENT: GW-184 DEEP: GW-187, GW-189 AND GW-224
DOWNGRADIENT: ALL OTHER WELLS
RECOM. MAX. CONC. LIMIT: 0.3 MG/L - MAX. DETECTION LIMIT: 0.004 MG/L

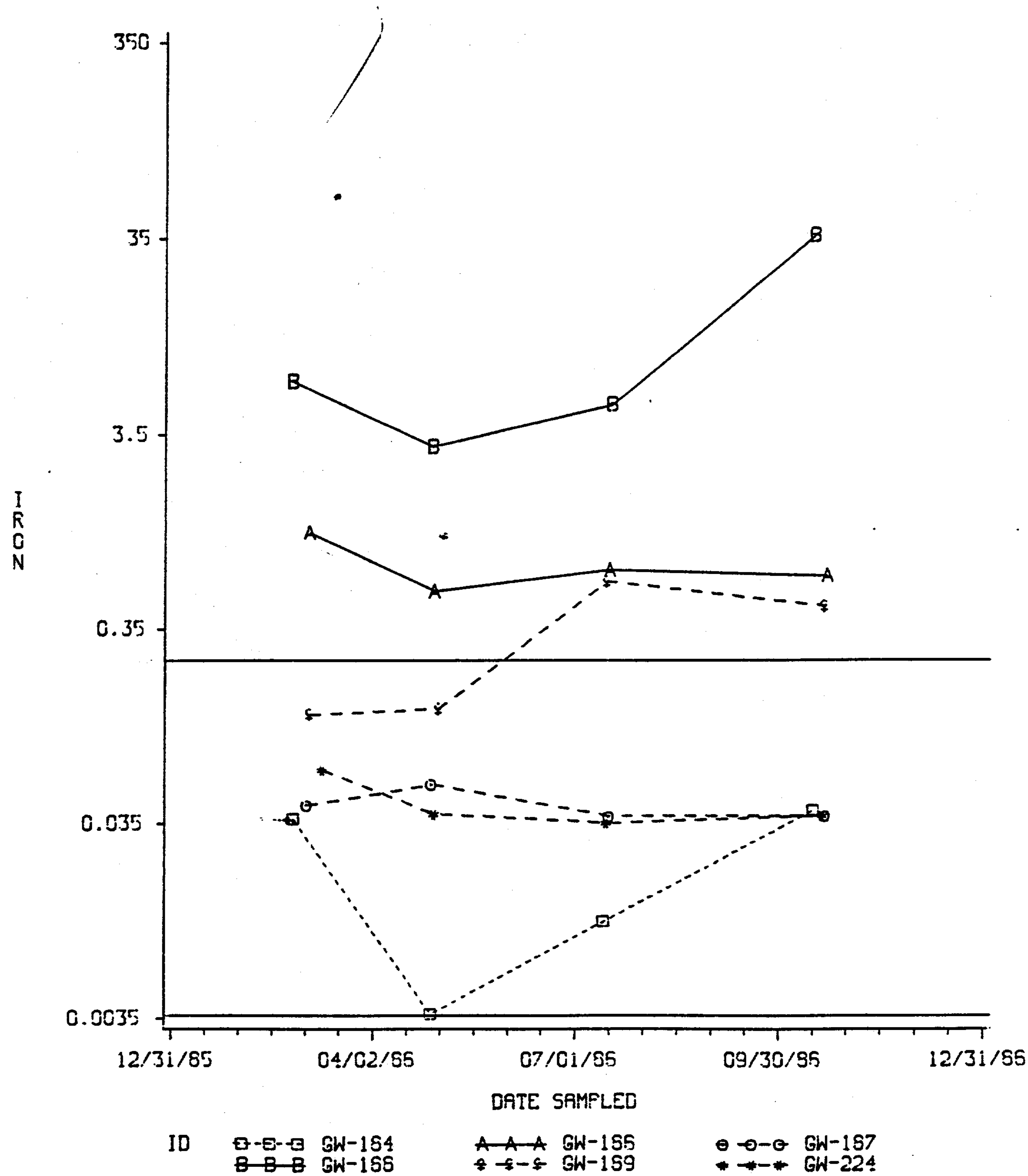


FIGURE 28

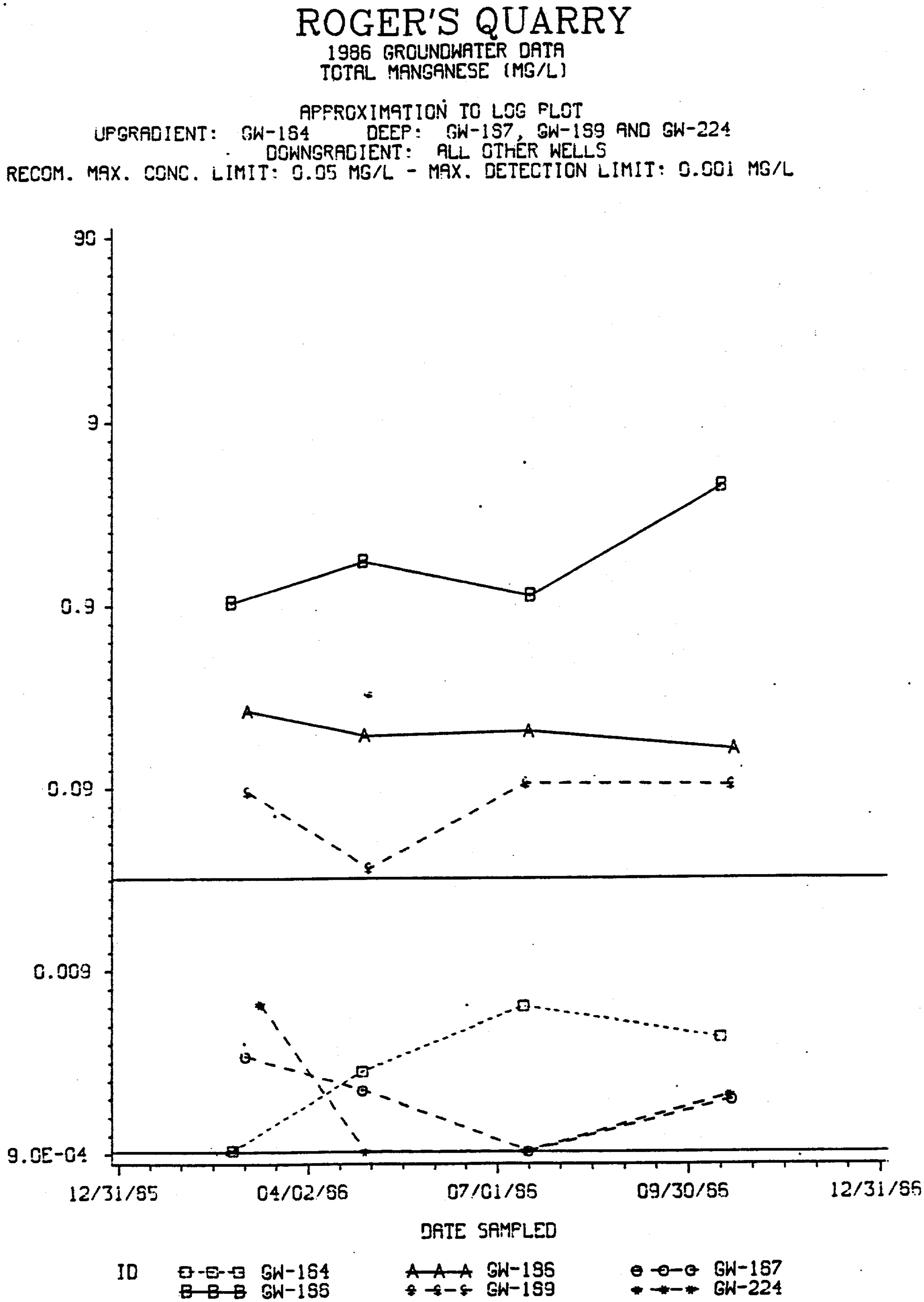

ROGER'S QUARRY
1986 GROUNDWATER DATA
TOTAL MANGANESE (MG/L)
APPROXIMATION TO LOG PLOT
UPGRADIENT: GW-184 DEEP: GW-187, GW-189 AND GW-224
DOWNGRADIENT: ALL OTHER WELLS
RECOM. MAX. CONC. LIMIT: 0.05 MG/L - MAX. DETECTION LIMIT: 0.001 MG/L
90
9
0.9
0.09
0.009
9.0E-04
MANGANESE
12/31/85
04/02/86
07/01/86
09/30/86
12/31/86
DATE SAMPLED
ID
GW-184
GW-186
GW-187
GW-185
GW-189
GW-224

FIGURE 29

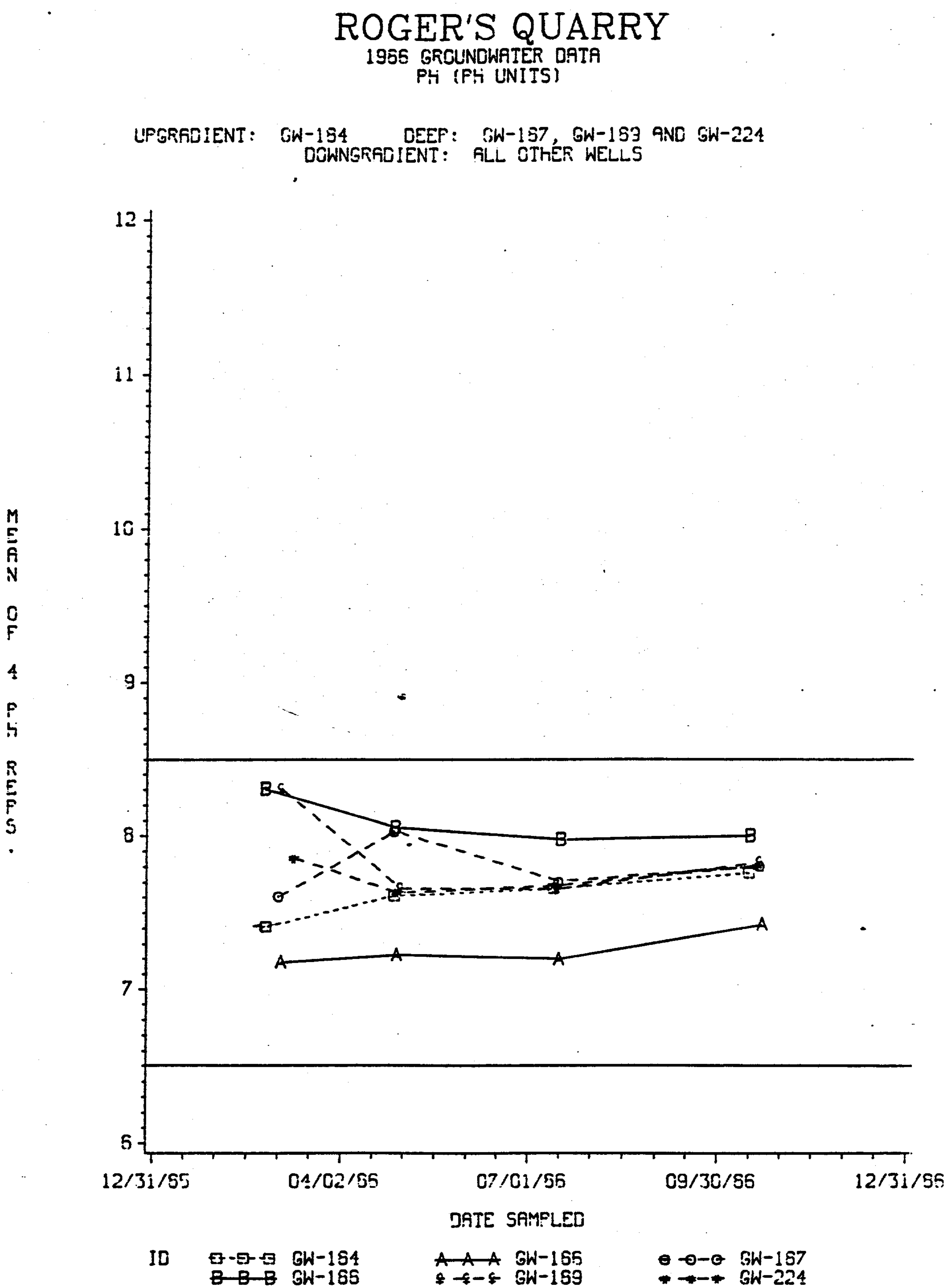

ROGER'S QUARRY
1986 GROUNDWATER DATA
PH (PH UNITS)
UPGRADIENT: GW-184 DEEP: GW-187, GW-189 AND GW-224
DOWNGRADIENT: ALL OTHER WELLS
MEAN OF 4 PH REPS.
12
11
10
9
8
7
6
12/31/85
04/02/86
07/01/86
09/30/86
12/31/86
DATE SAMPLED
ID GW-184
GW-186
GW-185
GW-189
GW-187
GW-224

FIGURE 30

ROGER'S QUARRY

1986 GROUNDWATER DATA
PHENOLS (MG/L)

APPROXIMATION TO LOG PLOT
UPGRADIENT: GW-184 DEEP: GW-187, GW-189 AND GW-224
DOWNGRADIENT: ALL OTHER WELLS

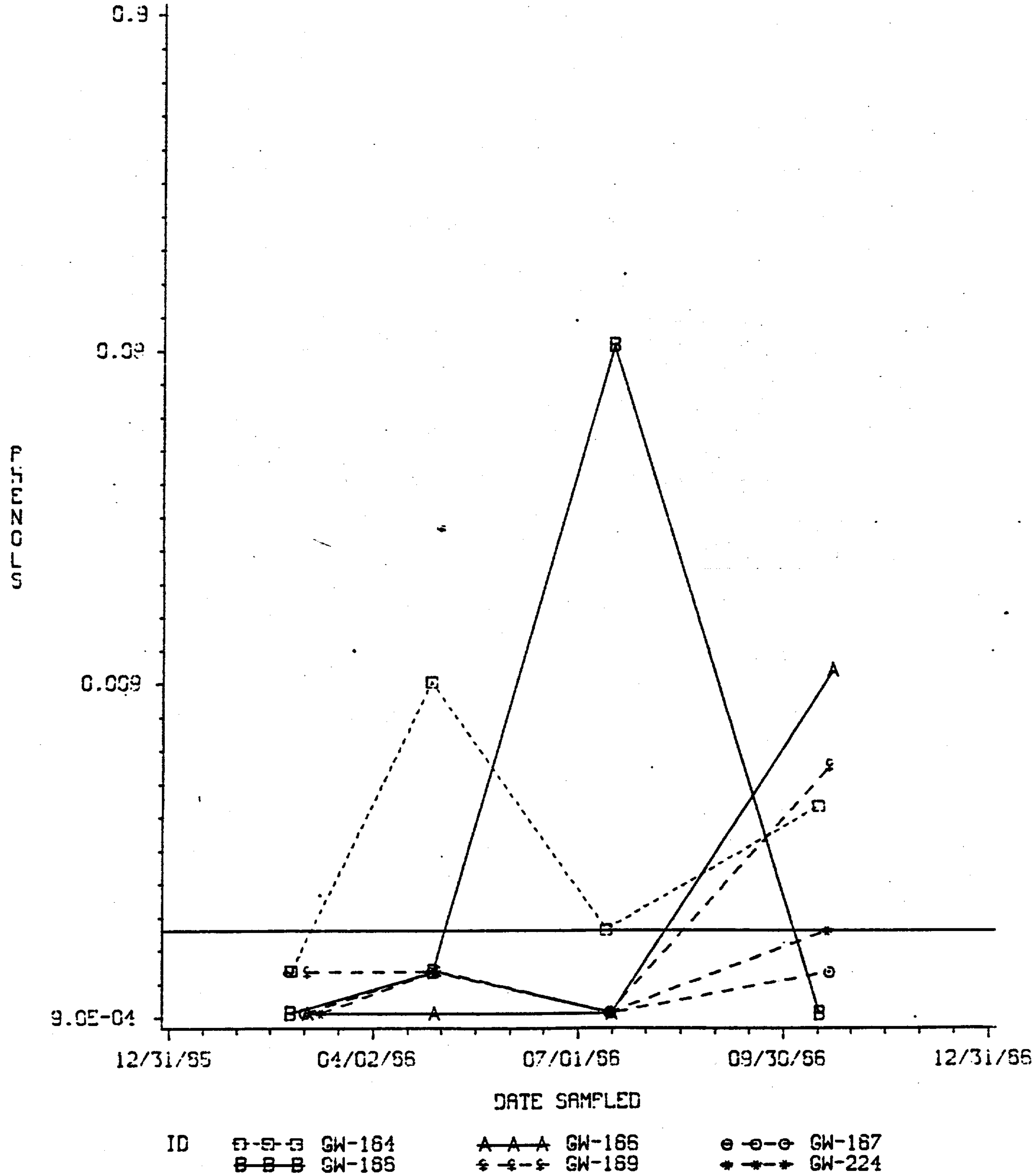


FIGURE 31

ROGER'S QUARRY

1966 GROUNDWATER DATA
TOTAL SODIUM (MG/L)

APPROXIMATION TO LOG PLOT
UPGRADIENT: GW-164 DEEP: GW-167, GW-169 AND GW-224
DOWNGRADIENT: ALL OTHER WELLS

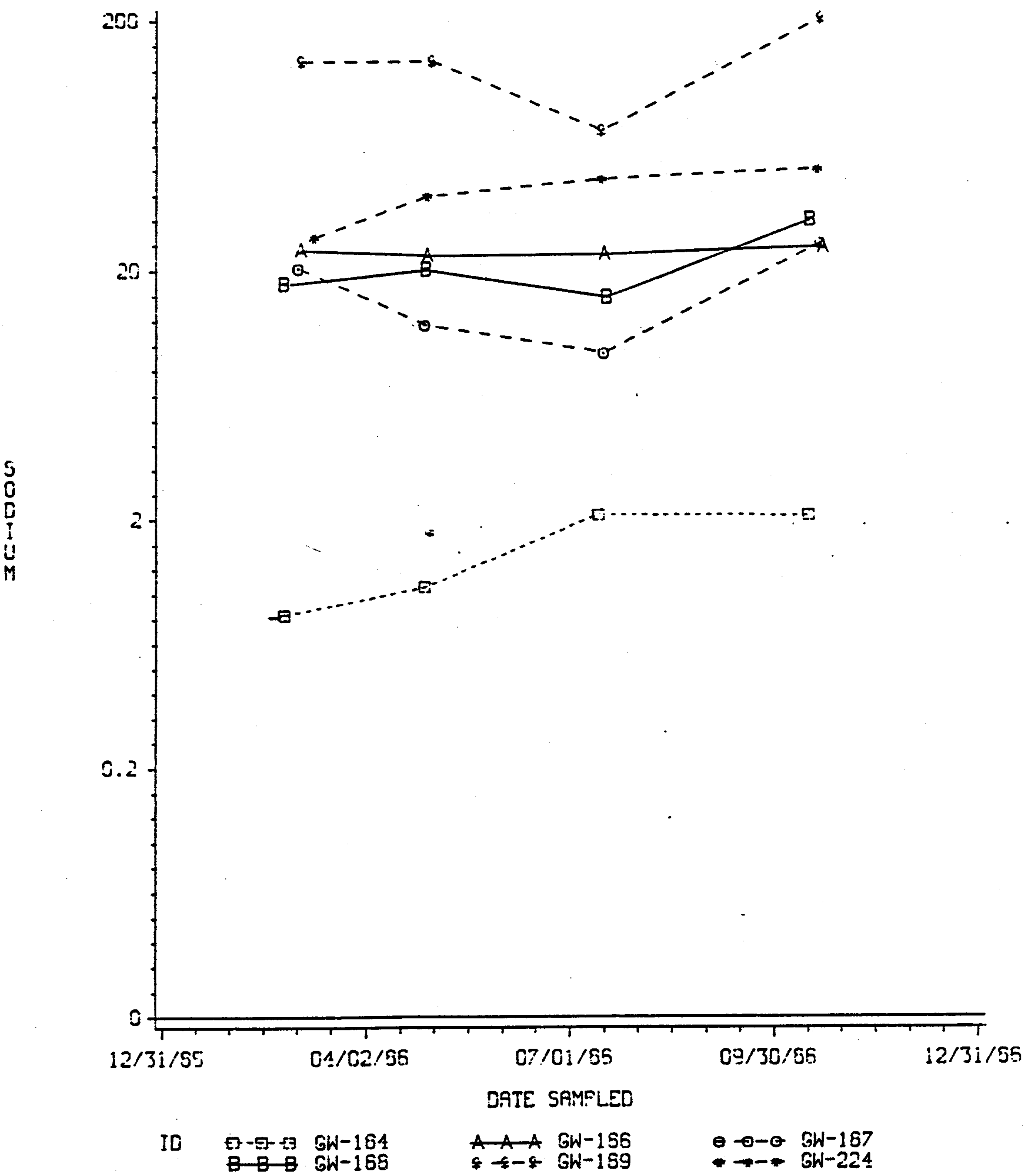


FIGURE 32

ROGER'S QUARRY

1986 GROUNDWATER DATA
SULFATE (MG/L)

APPROXIMATION TO LOG PLOT
UPGRADIENT: GW-164 DEEP: GW-167, GW-169 AND GW-224
DOWNGRADIENT: ALL OTHER WELLS

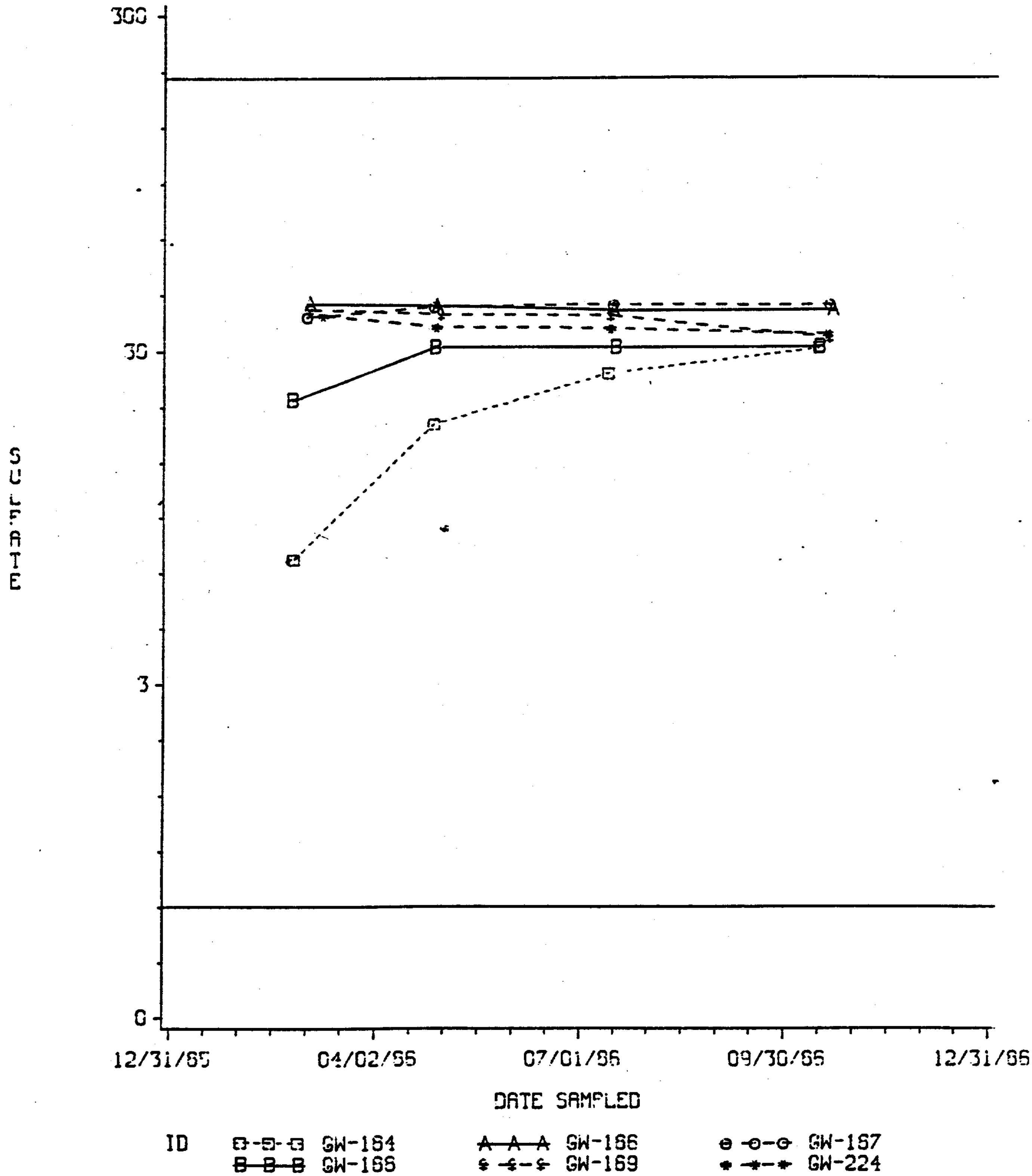


FIGURE 33

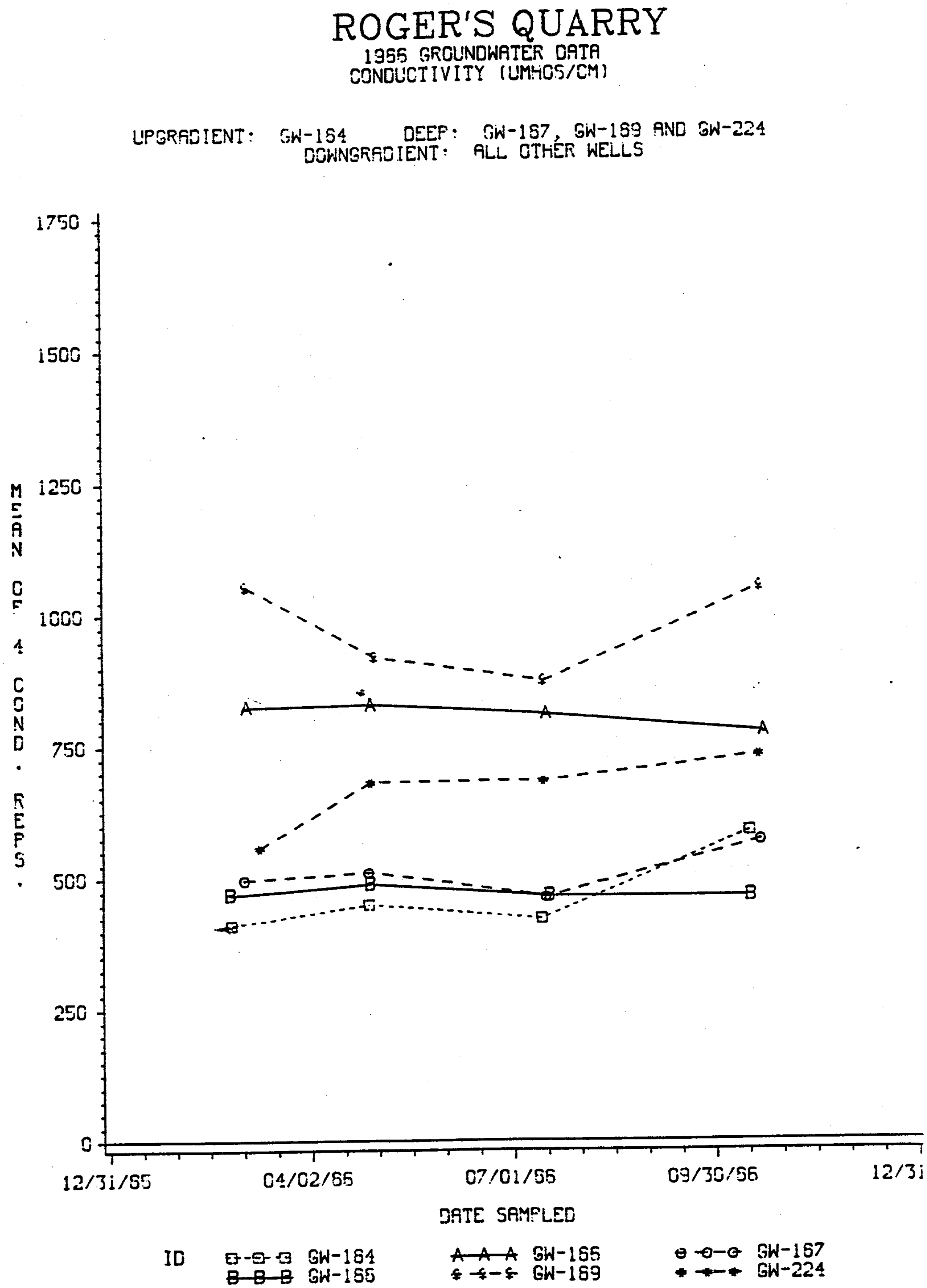

ROGER'S QUARRY
1986 GROUNDWATER DATA
CONDUCTIVITY (UMHOS/CM)
UPGRADIENT: GW-164 DEEP: GW-167, GW-169 AND GW-224
DOWNGRADIENT: ALL OTHER WELLS
MEAN OF 4 COND. REPS.
1750
1500
1250
1000
750
500
250
0
12/31/85
04/02/86
07/01/86
09/30/86
12/31
DATE SAMPLED
ID
GW-164
GW-166
GW-167
GW-165
GW-169
GW-224

FIGURE 34

ROGER'S QUARRY

1986 GROUNDWATER DATA
TOTAL ORGANIC CARBON (MG/L)

UPGRADIENT: GW-184 DEEP: GW-187, GW-189 AND GW-224
DOWNGRADIENT: ALL OTHER WELLS

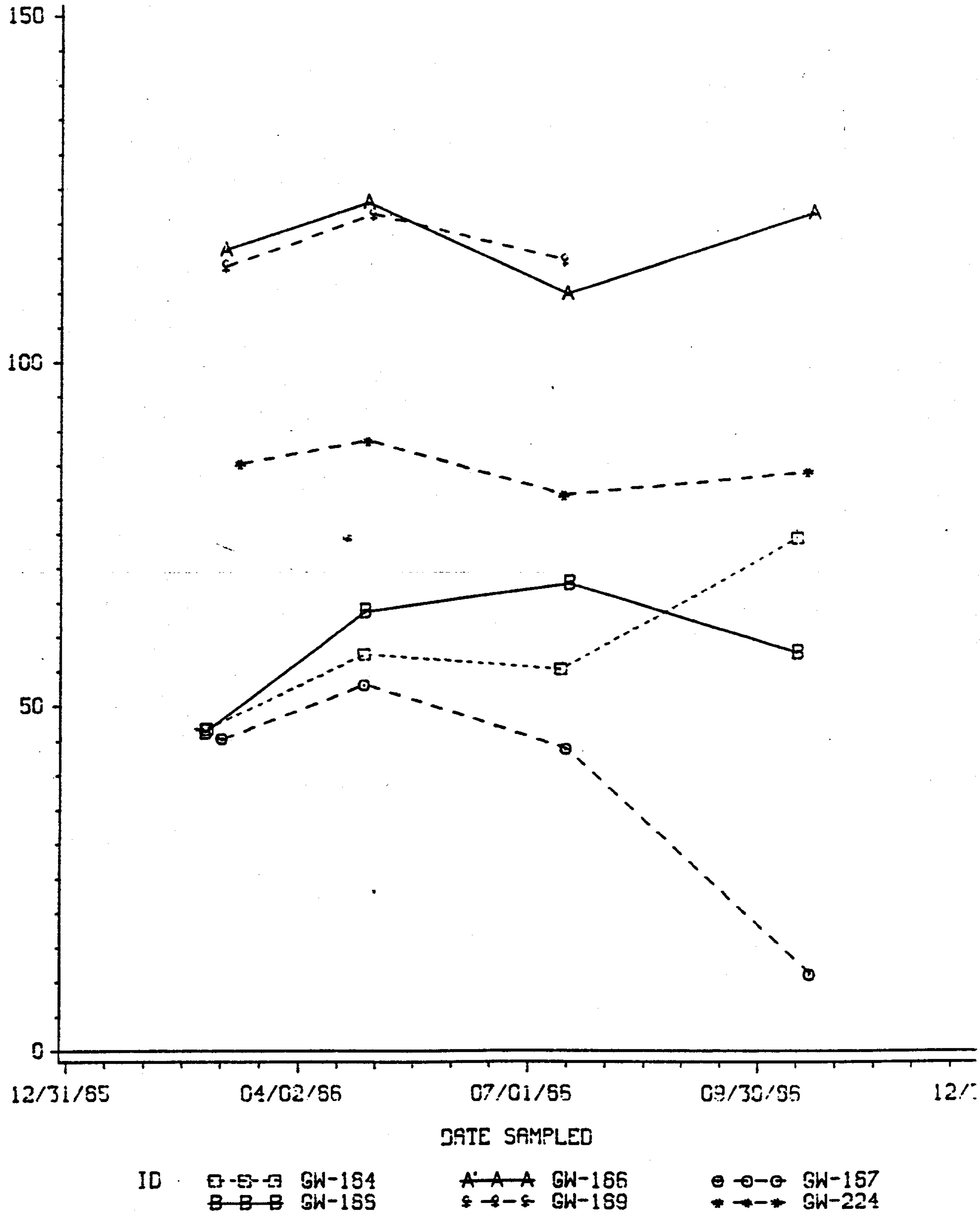
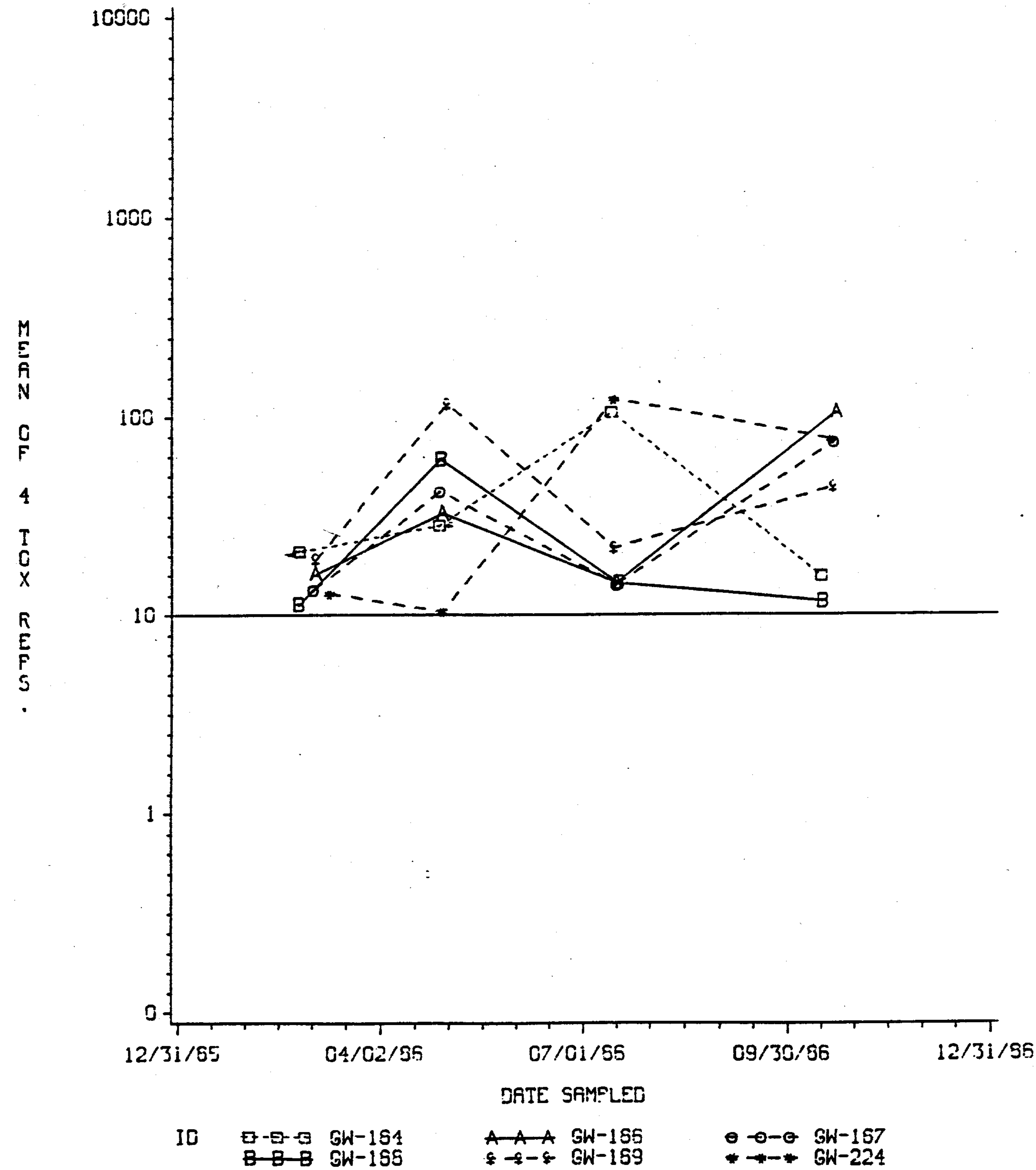


FIGURE 35

ROGER'S QUARRY

1986 GROUNDWATER DATA
TOTAL ORGANIC HALOGEN (UG/L)

APPROXIMATION TO LOG PLOT
UPGRADIENT: GW-184 DEEP: GW-187, GW-189 AND GW-224
DOWNGRADIENT: ALL OTHER WELLS



APPENDIX 3

WATER LEVEL DATA BY WELL FOR CY 1986

1986 WATER LEVEL DATA
FOR WELLS IN THE Y-12 WASTE DISPOSAL FACILITLIES
HEAD = TOC ELEV - (DEPTH TO WATER FROM TOC X 3.28)

------------------------------- WELL=GW-184 -------------------------------

DATE SAMPLED	HEAD (FT)	TOP OF CASING ELEV. (FT)	DEPTH TO WATER FROM TOC (M)
01/17/86	817.520	927.63	33.57
01/23/86	816.963	927.63	33.74
01/31/86	817.127	927.63	33.69
02/06/86	836.216	927.63	27.87
02/13/86	818.111	927.63	33.39
02/20/86	818.767	927.63	33.19
03/06/86	817.455	927.63	33.59
03/13/86	819.620	927.63	32.93
03/20/86	820.571	927.63	32.64
03/26/86	819.292	927.63	33.03
04/04/86	817.389	927.63	33.61
04/11/86	817.652	927.63	33.53
04/18/86	817.717	927.63	33.51
04/25/86	817.127	927.63	33.69
05/01/86	817.127	927.63	33.69
05/08/86	817.291	927.63	33.64
05/16/86	816.110	927.63	34.00
05/22/86	816.668	927.63	33.83
06/05/86	816.569	927.63	33.86
06/12/86	816.733	927.63	33.81
06/19/86	816.700	927.63	33.82
06/26/86	816.569	927.63	33.86
07/10/86	816.176	927.63	33.98
07/17/86	815.684	927.63	34.13
07/25/86	815.782	927.63	34.10
08/01/86	815.421	927.63	34.21
08/08/86	815.651	927.63	34.14
08/15/86	815.651	927.63	34.14
08/22/86	815.848	927.63	34.08
08/28/86	815.782	927.63	34.10
09/05/86	815.060	927.63	34.32
09/11/86	816.307	927.63	33.94
09/18/86	816.668	927.63	33.83
09/25/86	816.733	927.63	33.81
10/04/86	816.963	927.63	33.74
10/09/86	810.075	927.63	35.84
10/17/86	816.963	927.63	33.74
10/24/86	817.094	927.63	33.70
10/31/86	816.832	927.63	33.78
11/07/86	817.324	927.63	33.63
11/14/86	818.537	927.63	33.26
11/20/86	819.292	927.63	33.03
12/03/86	817.717	927.63	33.51
12/12/86	819.456	927.63	32.98
12/19/86	818.734	927.63	33.20
12/29/86	816.930	927.63	33.75

1986 WATER LEVEL DATA
FOR WELLS IN THE Y-12 WASTE DISPOSAL FACILITLIES
HEAD = TOC ELEV - (DEPTH TO WATER FROM TOC X 3.28)

---------------------------- WELL=GW-186 ----------------------------

DATE SAMPLED	HEAD (FT)	TOP OF CASING ELEV. (FT)	DEPTH TO WATER FROM TOC (M)
01/23/86	817.052	831.32	4.35
01/31/86	816.790	831.32	4.43
02/06/86	817.347	831.32	4.26
02/13/86	817.150	831.32	4.32
02/20/86	817.642	831.32	4.17
03/06/86	816.888	831.32	4.40
03/13/86	817.380	831.32	4.25
03/20/86	817.675	831.32	4.16
03/26/86	817.183	831.32	4.31
04/04/86	816.986	831.32	4.37
04/11/86	817.118	831.32	4.33
04/18/86	816.724	831.32	4.45
04/25/86	816.626	831.32	4.48
05/01/86	816.822	831.32	4.42
05/08/86	817.052	831.32	4.35
05/16/86	816.855	831.32	4.41
05/22/86	816.888	831.32	4.40
06/05/86	817.118	831.32	4.33
06/12/86	817.216	831.32	4.30
06/19/86	817.052	831.32	4.35
06/26/86	816.888	831.32	4.40
07/10/86	816.986	831.32	4.37
07/17/86	817.085	831.32	4.34
07/25/86	816.494	831.32	4.52
08/01/86	816.822	831.32	4.42
08/08/86	816.429	831.32	4.54
08/15/86	816.462	831.32	4.53
08/22/86	816.855	831.32	4.41
08/28/86	817.085	831.32	4.34
09/05/86	816.265	831.32	4.59
09/11/86	817.085	831.32	4.34
09/18/86	817.118	831.32	4.33
09/25/86	817.052	831.32	4.35
10/02/86	817.150	831.32	4.32
10/09/86	816.954	831.32	4.38
10/17/86	817.314	831.32	4.27
10/24/86	817.183	831.32	4.31
10/31/86	817.019	831.32	4.36
11/07/86	817.085	831.32	4.34
11/14/86	817.249	831.32	4.29
11/20/86	817.216	831.32	4.30
12/03/86	817.347	831.32	4.26
12/12/86	817.905	831.32	4.09
12/19/86	817.282	831.32	4.28
12/29/86	817.085	831.32	4.34

1986 WATER LEVEL DATA FOR WELLS IN THE Y-12 WASTE DISPOSAL FACILITLIES HEAD = TOC ELEV - (DEPTH TO WATER FROM TOC X 3.28)

------------------------------ WELL=GW-187 ------------------------------

DATE SAMPLED	HEAD (FT)	TOP OF CASING ELEV. (FT)	DEPTH TO WATER FROM TOC (M)
01/17/86	816.010	834.28	5.57
01/23/86	815.584	834.28	5.70
01/31/86	815.453	834.28	5.74
02/06/86	816.502	834.28	5.42
02/13/86	815.748	834.28	5.65
02/20/86	817.060	834.28	5.25
03/06/86	815.354	834.28	5.77
03/13/86	816.142	834.28	5.53
03/20/86	816.732	834.28	5.35
03/26/86	815.617	834.28	5.69
04/04/86	815.354	834.28	5.77
04/11/86	815.354	834.28	5.77
04/17/86	815.256	834.28	5.80
04/25/86	815.223	834.28	5.81
05/01/86	815.322	834.28	5.78
05/08/86	815.289	834.28	5.79
05/16/86	815.026	834.28	5.87
05/22/86	815.092	834.28	5.85
06/05/86	815.814	834.28	5.63
06/12/86	815.879	834.28	5.61
06/19/86	815.518	834.28	5.72
06/26/86	815.518	834.28	5.72
07/10/86	815.453	834.28	5.74
07/17/86	815.387	834.28	5.76
07/25/86	815.256	834.28	5.80
08/01/86	815.158	834.28	5.83
08/08/86	814.436	834.28	6.05
08/15/86	815.092	834.28	5.85
08/22/86	815.125	834.28	5.84
08/28/86	815.158	834.28	5.83
09/05/86	815.158	834.28	5.83
09/11/86	815.158	834.28	5.83
09/18/86	815.289	834.28	5.79
09/25/86	815.453	834.28	5.74
10/02/86	815.486	834.28	5.73
10/09/86	815.190	834.28	5.82
10/17/86	815.617	834.28	5.69
10/24/86	815.781	834.28	5.64
10/31/86	815.158	834.28	5.83
11/07/86	815.190	834.28	5.82
11/13/86	815.748	834.28	5.65
11/20/86	814.994	834.28	5.88
12/03/86	815.387	834.28	5.76
12/12/86	817.454	834.28	5.13
12/19/86	815.420	834.28	5.75
12/29/86	815.026	834.28	5.87

1986 WATER LEVEL DATA
FOR WELLS IN THE Y-12 WASTE DISPOSAL FACILITLIES
HEAD = TOC ELEV - (DEPTH TO WATER FROM TOC X 3.28)

WELL=GW-188

DATE SAMPLED	HEAD (FT)	TOP OF CASING ELEV. (FT)	DEPTH TO WATER FROM TOC (M)
01/17/86	817.312	837.09	6.03
01/23/86	817.115	837.09	6.09
01/31/86	816.951	837.09	6.14
02/06/86	817.180	837.09	6.07
02/13/86	817.180	837.09	6.07
02/20/86	817.213	837.09	6.06
03/06/86	816.984	837.09	6.13
03/13/86	817.246	837.09	6.05
03/20/86	817.476	837.09	5.98
03/26/86	817.312	837.09	6.03
04/04/86	817.180	837.09	6.07
04/11/86	817.279	837.09	6.04
04/18/86	817.279	837.09	6.04
04/25/86	817.148	837.09	6.08
05/01/86	817.180	837.09	6.07
05/08/86	817.279	837.09	6.04
05/16/86	817.115	837.09	6.09
05/22/86	817.148	837.09	6.08
06/05/86	817.246	837.09	6.05
06/12/86	817.180	837.09	6.07
06/19/86	817.180	837.09	6.07
06/26/86	817.180	837.09	6.07
07/10/86	817.148	837.09	6.08
07/17/86	.	837.09	.
07/25/86	817.049	837.09	6.11
08/01/86	817.016	837.09	6.12
08/08/86	817.082	837.09	6.10
08/15/86	817.115	837.09	6.09
08/22/86	817.049	837.09	6.11
08/28/86	817.115	837.09	6.09
09/05/86	816.951	837.09	6.14
09/11/86	817.115	837.09	6.09
09/18/86	817.246	837.09	6.05
09/25/86	817.246	837.09	6.05
10/02/86	817.377	837.09	6.01
10/09/86	817.213	837.09	6.06
10/17/86	.	837.09	.
10/24/86	816.852	837.09	6.17
10/31/86	817.049	837.09	6.11
11/07/86	817.246	837.09	6.05
11/14/86	817.082	837.09	6.10
11/20/86	817.180	837.09	6.07
12/03/86	817.115	837.09	6.09
12/12/86	817.344	837.09	6.02
12/19/86	817.082	837.09	6.10
12/29/86	817.016	837.09	6.12

1986 WATER LEVEL DATA
FOR WELLS IN THE Y-12 WASTE DISPOSAL FACILITLIES
HEAD = TOC ELEV - (DEPTH TO WATER FROM TOC X 3.28)

------------------------------ WELL=GW-189 ------------------------------

DATE SAMPLED	HEAD (FT)	TOP OF CASING ELEV. (FT)	DEPTH TO WATER FROM TOC (M)
01/17/86	817.131	831.53	4.39
01/31/86	817.426	831.53	4.30
02/06/86	817.524	831.53	4.27
02/13/86	817.360	831.53	4.32
02/20/86	817.787	831.53	4.19
03/06/86	817.131	831.53	4.39
03/13/86	817.492	831.53	4.28
03/20/86	817.787	831.53	4.19
03/26/86	817.426	831.53	4.30
04/04/86	817.524	831.53	4.27
04/11/86	817.328	831.53	4.33
04/18/86	816.934	831.53	4.45
04/25/86	817.131	831.53	4.39
05/08/86	817.196	831.53	4.37
05/16/86	817.000	831.53	4.43
05/22/86	817.000	831.53	4.43
06/05/86	817.229	831.53	4.36
06/12/86	817.262	831.53	4.35
06/19/86	817.164	831.53	4.38
06/26/86	817.196	831.53	4.37
07/10/86	817.131	831.53	4.39
07/17/86	817.164	831.53	4.38
07/25/86	816.606	831.53	4.55
08/01/86	816.967	831.53	4.44
08/08/86	817.000	831.53	4.43
08/15/86	816.639	831.53	4.54
08/22/86	816.967	831.53	4.44
08/28/86	817.164	831.53	4.38
09/05/86	816.573	831.53	4.56
09/11/86	817.164	831.53	4.38
09/18/86	817.196	831.53	4.37
09/25/86	817.131	831.53	4.39
10/02/86	817.229	831.53	4.36
10/09/86	817.065	831.53	4.41
10/17/86	817.295	831.53	4.34
10/24/86	817.164	831.53	4.38
10/31/86	817.065	831.53	4.41
11/07/86	817.131	831.53	4.39
11/14/86	817.196	831.53	4.37
11/20/86	817.229	831.53	4.36
12/03/86	817.229	831.53	4.36
12/12/86	817.656	831.53	4.23
12/19/86	817.196	831.53	4.37
12/29/86	817.032	831.53	4.42

1986 WATER LEVEL DATA
FOR WELLS IN THE Y-12 WASTE DISPOSAL FACILITLIES
HEAD = TOC ELEV - (DEPTH TO WATER FROM TOC X 3.28)

WELL=GW-224

DATE SAMPLED	HEAD (FT)	TOP OF CASING ELEV. (FT)	DEPTH TO WATER FROM TOC (M)
01/17/86	816.738	835.04	5.58
01/23/86	816.672	835.04	5.60
01/31/86	816.738	835.04	5.58
02/06/86	817.853	835.04	5.24
02/13/86	817.262	835.04	5.42
02/20/86	818.443	835.04	5.06
03/06/86	816.803	835.04	5.56
03/13/86	817.886	835.04	5.23
03/20/86	818.115	835.04	5.16
03/26/86	817.066	835.04	5.48
04/04/86	816.770	835.04	5.57
04/11/86	816.869	835.04	5.54
04/17/86	816.770	835.04	5.57
04/25/86	816.672	835.04	5.60
05/01/86	816.639	835.04	5.61
05/08/86	816.738	835.04	5.58
05/16/86	816.508	835.04	5.65
05/22/86	816.278	835.04	5.72
06/05/86	816.803	835.04	5.56
06/12/86	816.967	835.04	5.51
06/19/86	815.590	835.04	5.93
06/26/86	816.705	835.04	5.59
07/10/86	816.606	835.04	5.62
07/17/86	816.738	835.04	5.58
07/25/86	816.639	835.04	5.61
08/01/86	816.541	835.04	5.64
08/08/86	816.606	835.04	5.62
08/15/86	816.606	835.04	5.62
08/22/86	816.541	835.04	5.64
08/28/86	816.672	835.04	5.60
09/05/86	816.639	835.04	5.61
09/11/86	816.672	835.04	5.60
09/18/86	816.738	835.04	5.58
09/25/86	816.869	835.04	5.54
10/02/86	816.836	835.04	5.55
10/17/86	816.606	835.04	5.62
10/24/86	817.098	835.04	5.47
10/31/86	816.639	835.04	5.61
11/07/86	816.738	835.04	5.58
11/13/86	817.558	835.04	5.33
11/20/86	817.098	835.04	5.47
12/03/86	817.394	835.04.	5.38
12/12/86	818.804	835.04	4.95
12/19/86	817.098	835.04	5.47
12/29/86	816.606	835.04	5.62